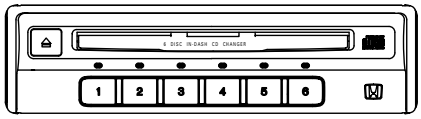
Service Manual

Pioneer

HONDA



ORDER NO.
CRT2351

6 DISC IN-DASH CD CHANGER

CDX-MG6036ZH US

COMPACT disc DIGITAL AUDIO

● This service manual should be used together with the following manual(s):

Model	Order No.	Mech. Module	Remarks
CX-890	CRT2376	G1	CD Mechanism Module:Circuit Description, Mechanism Description, Disassembly

VEHICLE	DESTINATION	PRODUCED AFTER	PART No.	ID No.	PIONEER MODEL No.
Not specified	U.S.A.	June 1999	08A06-3B1-3000	———	CDX-MG6036ZH/US

● **To operate this product, a 14-pin H-BUS head unit is required.**
When performing adjustments, connect the 8-pin/14-pin conversion jig (GGD1163) to a Pioneer 8-pin H-BUS head unit. You can use it in place of a 14-pin H-BUS head unit.

CONTENTS

1. SAFETY INFORMATION 2
2. EXPLODED VIEWS AND PARTS LIST 3
3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM ...10
4. PCB CONNECTION DIAGRAM 26
5. ELECTRICAL PARTS LIST 42
6. ADJUSTMENT.....46
7. GENERAL INFORMATION 48
7.1 DIAGNOSIS 48
7.1.1 TEST MODE 48
7.1.2 DISASSEMBLY 53
7.1.3 CONNECTOR FUNCTION DESCRIPTION 57
7.2 IC 58
8. OPERATIONS AND SPECIFICATIONS.....63

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

© **PIONEER ELECTRONIC CORPORATION 1999**

K-ZZB. JUNE 1999 Printed in Japan

● CD Player Service Precautions

1. For pickup unit(CXX1311) handling, please refer to"Disassembly"(see page 53).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).

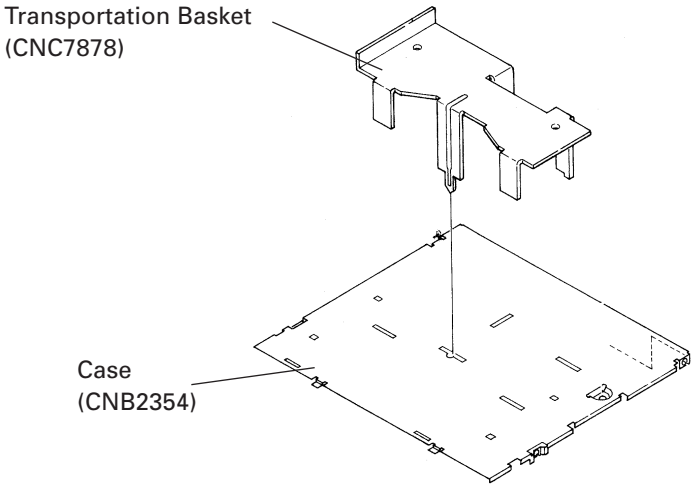
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

3. Please checking the grating after changing the service pickup unit(see page 46).

● When the Repair is Complete

When the repair is complete, make the CD mechanism ready for transportation implementing the following procedures:

1. Press the changer side 1 and 4 simultaneously to turn the ACC on.
2. As the ACC is turned on, the disc indicator blinks in red.
3. When the blinking is stopped, the mechanism is ready for the transportation.
4. Attach the Transportation Bracket (CNC7878). Now you can transport it.(See the figure below)

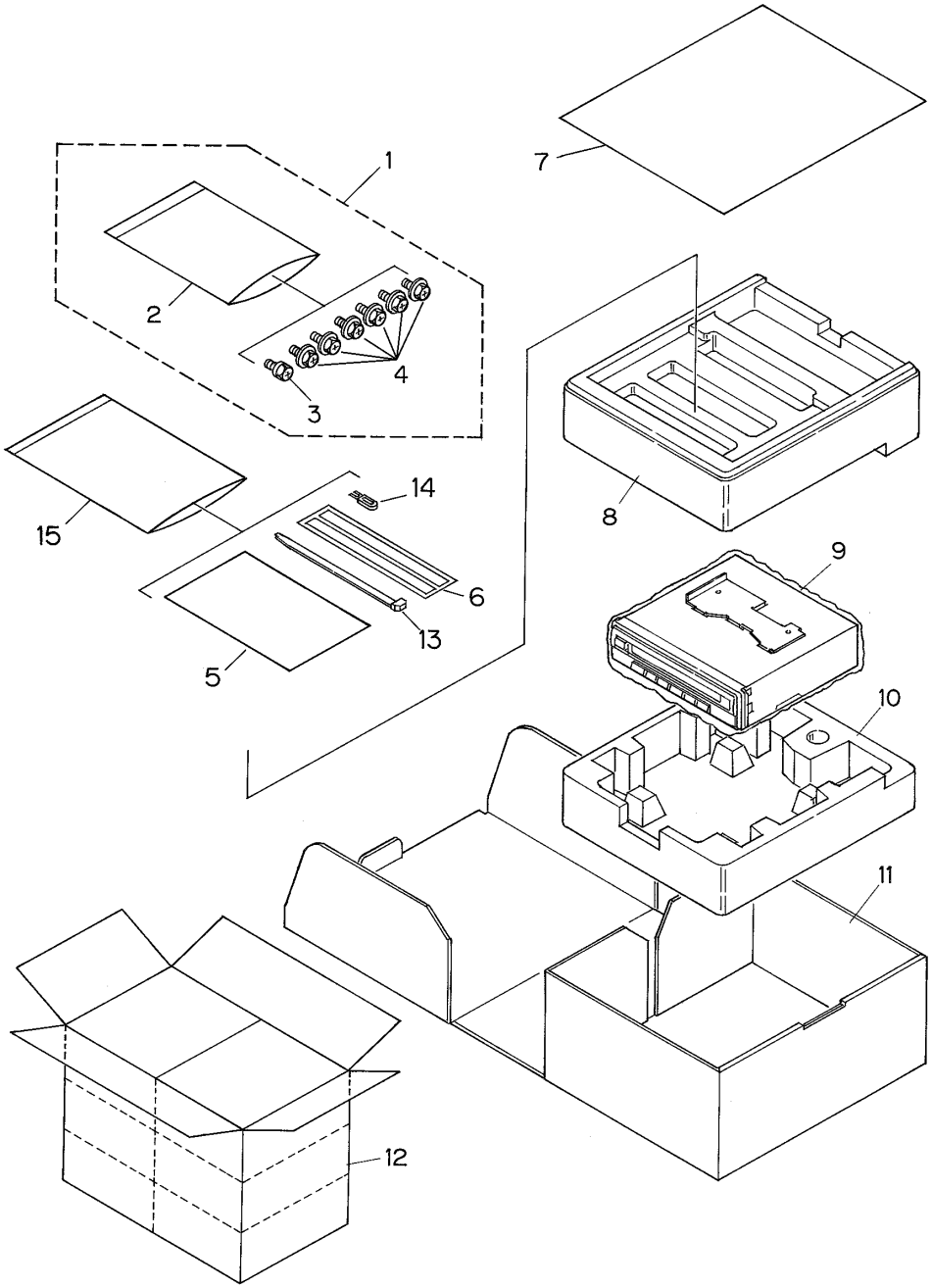


1. SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



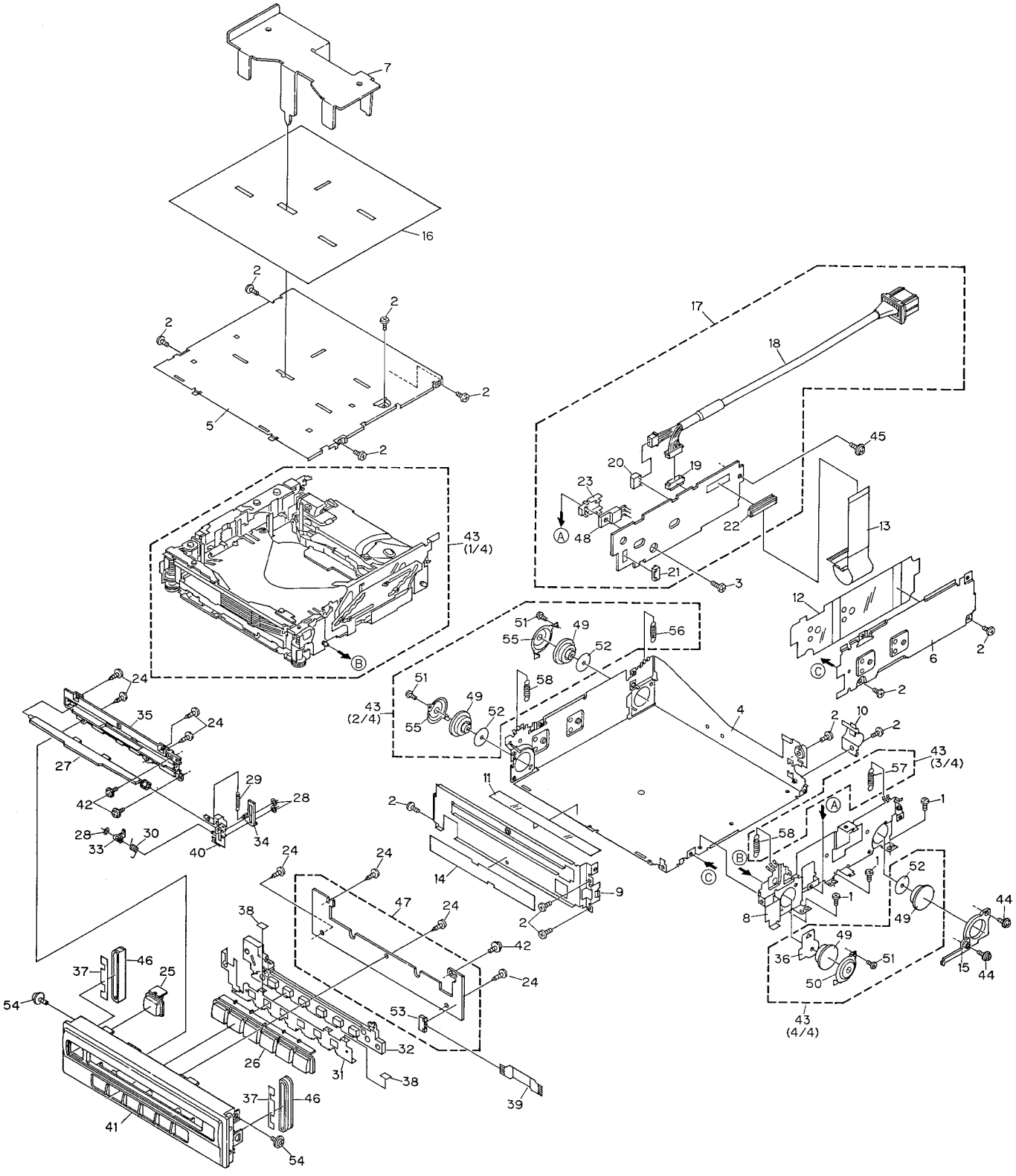
NOTE:

- Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.

● PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Screw Assy	CEA2565
*	2	Polyethylene Bag	CEG-127
	3	Screw	HMF40P060FZK
	4	Screw	HMF50P080FMC
	5	Owner's Manual(English)	CRB1553
	6	Spacer	CNM6551
*	7	Sheet	CHW1402
	8	Protector	CHP2123
*	9	Polyethylene Bag	E36-609
	10	Protector	CHP2124
	11	Carton	CHG3764
	12	Contain Box	CHL3764
	13	Clamper	CNV4042
*	14	Band	CNF-512
	15	Polyethylene Bag	CEG1116

2.2 EXTERIOR

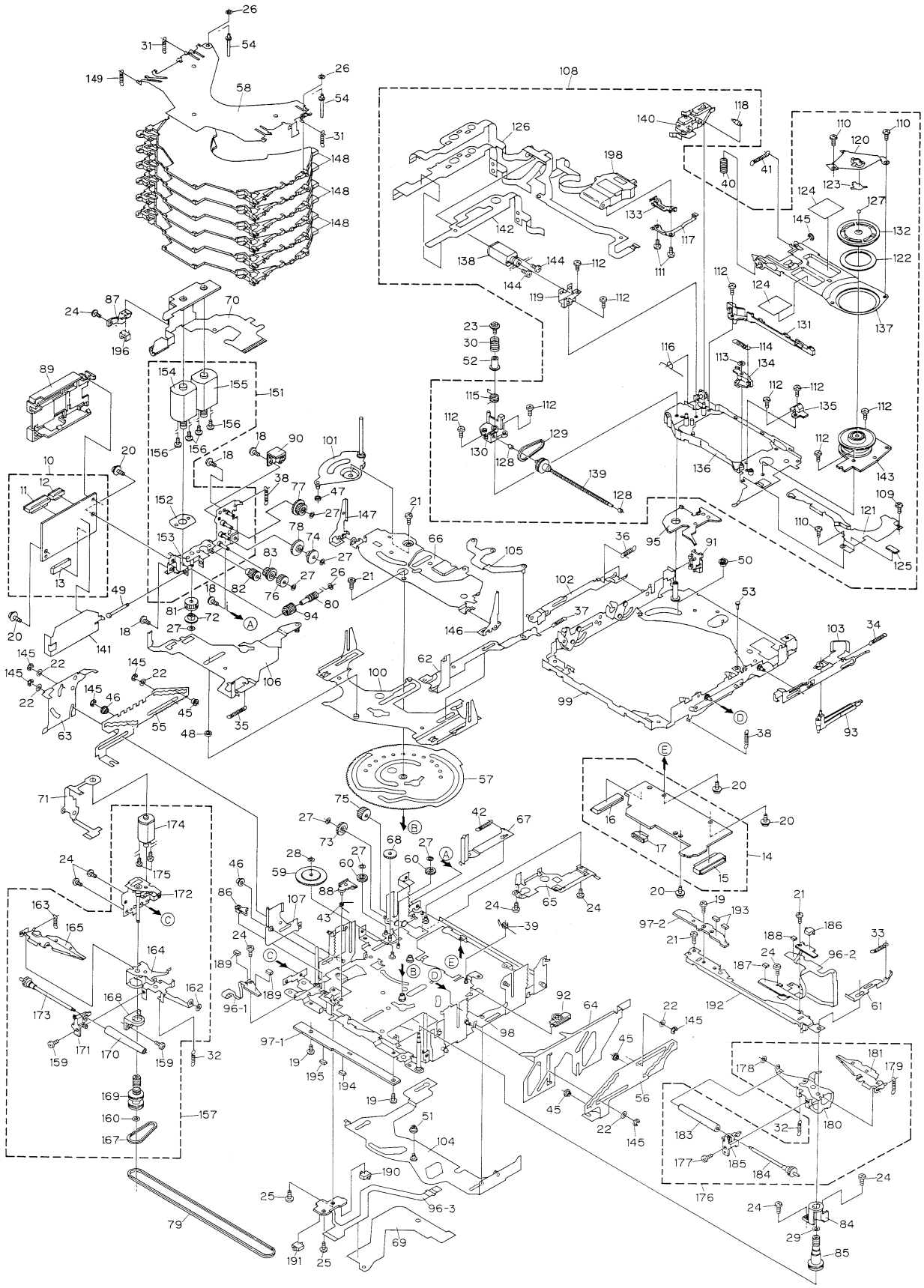

7
16
2
5
17
18
45
20
19
23
48
22
13
21
3
43
(1/4)
12
6
51
49
55
52
56
58
43
(2/4)
4
10
24
35
27
29
42
28
33
30
40
34
11
14
9
43
(3/4)
57
1
58
8
52
49
44
15
36
50
43
(4/4)
47
38
46
25
54
26
32
31
53
39
41

● EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Screw	BMZ20P020FMC
	2	Screw	BMZ26P030FMC
	3	Screw	BMZ26P060FMC
	4	Chassis Unit	CXB3407
	5	Case	CNB2354
	6	Side Frame	CNB2397
	7	Bracket	CNC7878
	8	Bracket	CNC8026
	9	Front Frame	CNC8110
	10	Holder	CNC8111
	11	Insulator	CNM5969
	12	Insulator	CNM6112
	13	PCB	CNP5516
	14	Insulator	CNM6409
	15	Holder	CNV5543
*	16	Caution Label	CRP1200
	17	Extension Unit	CWM6288
	18	Cord	CDE6055
	19	Connector(CN102)	CKS2200
	20	Connector(CN103)	CKS3597
	21	Connector(CN701)	CKS3785
	22	Connector(CN101)	CKS3989
	23	Holder	CNC8031
	24	Screw	BPZ20P060FMC
	25	Button	CAC5864
	26	Button	CAC5865
	27	Door	CAT2003
	28	Washer	CBF1038
	29	Spring	CBH2201
	30	Spring	CBH2200

Mark	No.	Description	Part No.
	31	Conductor	CNC8051
	32	Lighting Conductor	CNV5901
	33	Gear	CNV5547
	34	Arm	CNV5548
	35	Guide	CNV5880
	36	Sheet	CNM6318
	37	Double Faced Tape	CNM6424
	38	Insulator	CNM6512
	39	PCB	CNP5373
	40	Bracket Unit	CXB3111
	41	Grille Unit	CXB3409
	42	Screw	IMS20P040FMC
	43	CD Mechanism Module(G1)	CXK4702
	44	Screw	IMS20P040FMC
	45	Screw	IMS26P040FMC
	46	Cushion	CNV5674
	47	Keyboard Unit	CWM6289
	48	Transistor(Q708)	2SB1335A
	49	Damper	CNV5120
	50	Holder	CNC7826
	51	Screw	CBA1250
	52	Sheet	CNM5981
	53	Connector(CN901)	CKS3785
	54	Screw	IMS26P030FZK
	55	Holder	CNC7477
	56	Spring(Left Rear)	CBH2065
	57	Spring(Right Rear)(Black)	CBH2067
	58	Spring(Front)	CBH2066

2.3 CD MECHANISM



● CD MECHANISM SECTION PARTS LIST

Mark	No.	Description	Part No.
	1-9	•••••	
	10	CD Core Unit(Servo Unit)	CWX2202
	11	Connector(CN101)	CKS2764
	12	Connector(CN301)	CKS3966
	13	Connector(CN201)	CKS3991
	14	CD Core Unit(STS Unit)	CWX2203
	15	Connector(CN701)	CKS3989
	16	Connector(CN801)	CKS3989
	17	Connector(CN802)	CKS4054
	18	Screw	CBA1037
	19	Screw	CBA1041
	20	Screw	CBA1076
	21	Screw	CBA1250
	22	Screw	CBA1405
	23	Screw	CBA1452
	24	Screw	CBA1453
	25	Screw	CBA1479
	26	Washer	CBF1037
	27	Washer	CBF1038
	28	Washer	CBF1039
	29	Washer	CBF1064
	30	Spring	CBH2007
	31	Spring	CBH2271
	32	Spring	CBH2274
	33	Spring	CBH2014
	34	Spring	CBH2015
	35	Spring	CBH2016
	36	Spring	CBH2017
	37	Spring	CBH2290
	38	Spring	CBH2019
	39	Spring	CBH2064
	40	Spring	CBH2195
	41	Spring	CBH2196
	42	Spring	CBH2224
	43	Spring	CBH2250
	44	•••••	
	45	Roller	CLA3154
	46	Roller	CLA3157
	47	Roller	CLA3159
	48	Roller	CLA3160
	49	Shaft	CLA3179
	50	Spacer	CLA3194
	51	Roller	CLA3248
	52	Bush	CLA3353
*	53	Shaft	CLA3469
	54	Shaft	CLA3693
	55	Steer	CNC7215
	56	Steer	CNC7216
	57	Cam	CNC7227
*	58	Holder	CNC7235
	59	Gear	CNC7236
	60	Gear	CNC7238
	61	Lever	CNC7243
	62	Lever	CNC7244
	63	Lever	CNC7245
	64	Lever	CNC7246
	65	Cover	CNC7441
	66	Holder	CNC8613
	67	Lever	CNC8024
	68	Gear	CNC8140
	69	Sheet	CNM5831
	70	PCB	CNP5680
	71	PCB	CNP5681
	72	Gear	CNR1479
	73	Gear	CNR1481
	74	Gear	CNR1495
	75	Gear	CNR1501
	76	Gear	CNR1502
	77	Gear	CNR1540
	78	Gear	CNR1541
	79	Belt	CNT1080
	80	Worm Gear	CNV5046
	81	Gear	CNV5047
	82	Gear	CNV5048
	83	Gear	CNV5049
	84	Holder	CNV5056
	85	Pulley	CNV5058
	86	Arm	CNV5061
	87	Spacer	CNV5066
	88	Arm	CNV5189
	89	Cover	CNV5207
	90	Cover	CNV5424
	91	Cover	CNV5425
	92	Lever	CNV5427
	93	Arm	CNV5491
	94	Gear	CNV5519
	95	Holder	CNV5648
	96	Composite PCB	CNX3141
	97	Composite PCB	CNX2989
	98	Chassis Unit	CXB4314

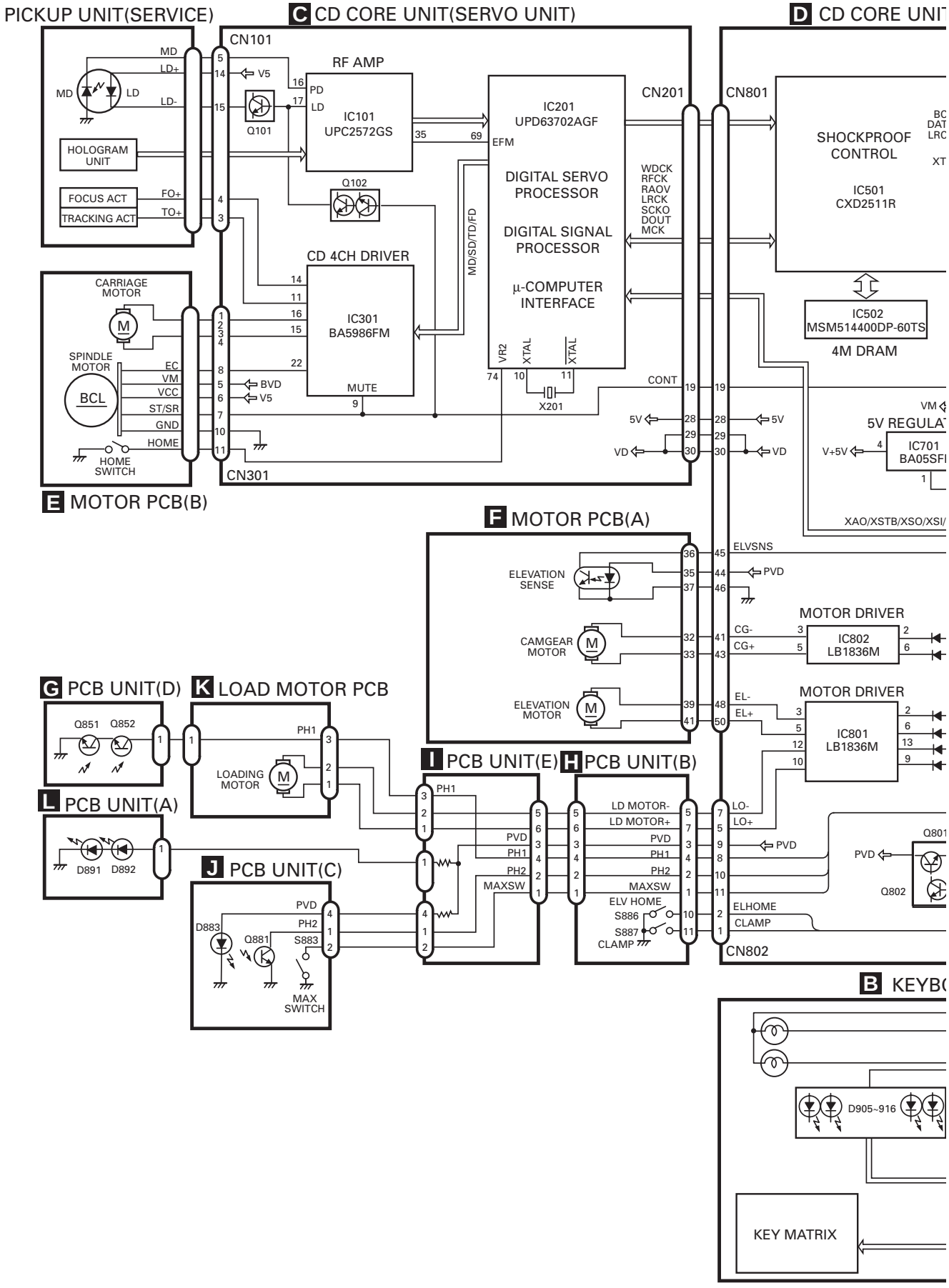
Mark	No.	Description	Part No.
	99	Frame Unit	CXB2702
	100	Lever Unit	CXB2703
	101	Arm Unit	CXB2704
	102	Lever Unit	CXB2708
	103	Lever Unit	CXB2709
	104	Lever Unit	CXB2711
	105	Arm Unit	CXB2712
	106	Lever Unit	CXB2713
	107	Lever Unit	CXB2714
	108	Carriage Mechanism Unit(G1)	CXB2998
	109	Screw	CBA1041
	110	Screw	CBA1250
	111	Screw	CBA1362
	112	Screw	CBA1471
	113	Washer	CBF1038
	114	Spring	CBH2008
	115	Spring	CBH2009
	116	Spring	CBH2010
	117	Spring	CBL1335
	118	Roller	CLA3707
*	119	Bracket	CNC7228
	120	Guide Unit	CXB4417
	121	Cover	CNC7628
	122	Sheet	CNM6414
	123	Sheet	CNM5378
	124	Sheet	CNM5695
	125	Sheet	CNM5827
	126	PCB	CNP4978
	127	Ball	CNR1189
	128	Bearing	CNR1423
	129	Belt	CNT1079
	130	Holder	CNV5037
	131	Guide	CNV5040
	132	Clamper	CNV5042
	133	Rack	CNV5111
	134	Arm	CNV5579
	135	Holder	CNV5759
*	136	Chassis	CXB2698
	137	Arm Unit	CXB2705
	138	Motor Unit(M4 CARRIAGE)	CXB3178
	139	Screw Unit	CXB3179
	140	Lever Unit	CXB4450
	141	Insulator	CNM6306
	142	Spacer	CNM6345
	143	Motor(M5 SPINDLE)	CXM1120

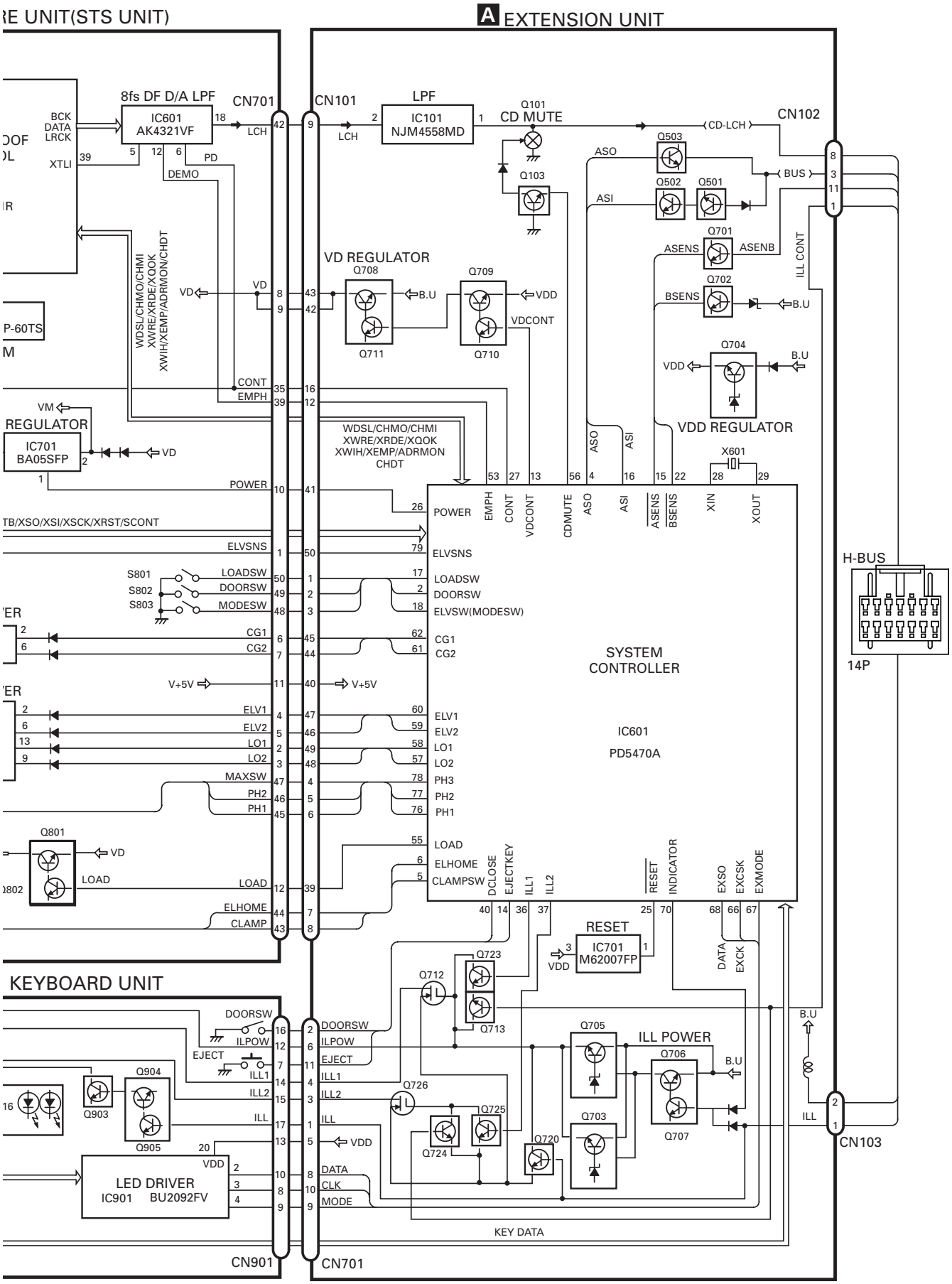
Mark	No.	Description	Part No.
	144	Screw	JFZ14P020FMC
	145	Washer	YE15FUC
	146	Arm Unit	CXB4953
	147	Arm Unit	CXB4954
	148	Tray Assy	CXB4307
	149	Spring	CBH2269
	150	•••••	
	151	Cam Motor Assy	CXB3170
	152	Spacer	CNC8289
*	153	Bracket Unit	CXB4165
*	154	Motor Unit(M1 Cam Gear)	CXB3174
*	155	Motor Unit(M3 ELV)	CXB3175
	156	Screw	JFZ20P025FMC
	157	Loading Arm L Assy	CXB3171
	158	•••••	
	159	Screw	CBA1453
	160	Washer	CBF1038
	161	•••••	
	162	Washer	CBF1074
	163	Spring	CBH2136
*	164	Arm	CNC7241
*	165	Arm	CXB4449
	166	•••••	
	167	Belt	CNT1079
	168	Holder	CNV5055
	169	Pulley	CNV5057
	170	Roller	CNV5064
	171	Guide	CNV5125
*	172	Bracket Unit	CXB4316
	173	Roller Gear Unit	CXB3176
	174	Motor Unit(M2 LOAD)	CXB3177
	175	Screw	JFZ14P020FMC
	176	Loading Arm R Assy	CXB3172
	177	Screw	CBA1453
	178	Washer	CBF1074
	179	Spring	CBH2136
*	180	Arm	CNC7242
*	181	Arm	CXB4448
	182	•••••	
	183	Roller	CNV5064
	184	Roller Gear Unit	CXB3176
	185	Guide	CNV5126
	186	Switch(S885 MAX)	CSN1052
	187	LED(D883)	CL202IRXTU
	188	Photo-transistor(Q881)	CPT230SCTD(CD)

Mark	No.	Description	Part No.
	189	LED(D891,892)	CL202IRXTU
	190	Switch(S887 CLAMP)	CSN1051
	191	Switch(S886 ELV HOME)	CSN1052
	192	Bracket Unit	CXB4306
	193	Photo-transistor(Q851,852)	CPT230SCTD(CD)
	194	Resistor(R856)	RS1/8S911J
	195	Resistor(R857)	RS1/8S821J
	196	Photo-interrupter(Q1)	RPI-221
	197	●●●●●	
	198	Pickup Unit(Service)(P8)	CXX1311

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

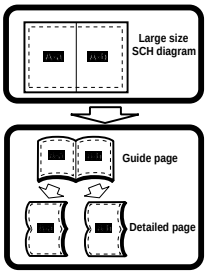
3.1 BLOCK DIAGRAM

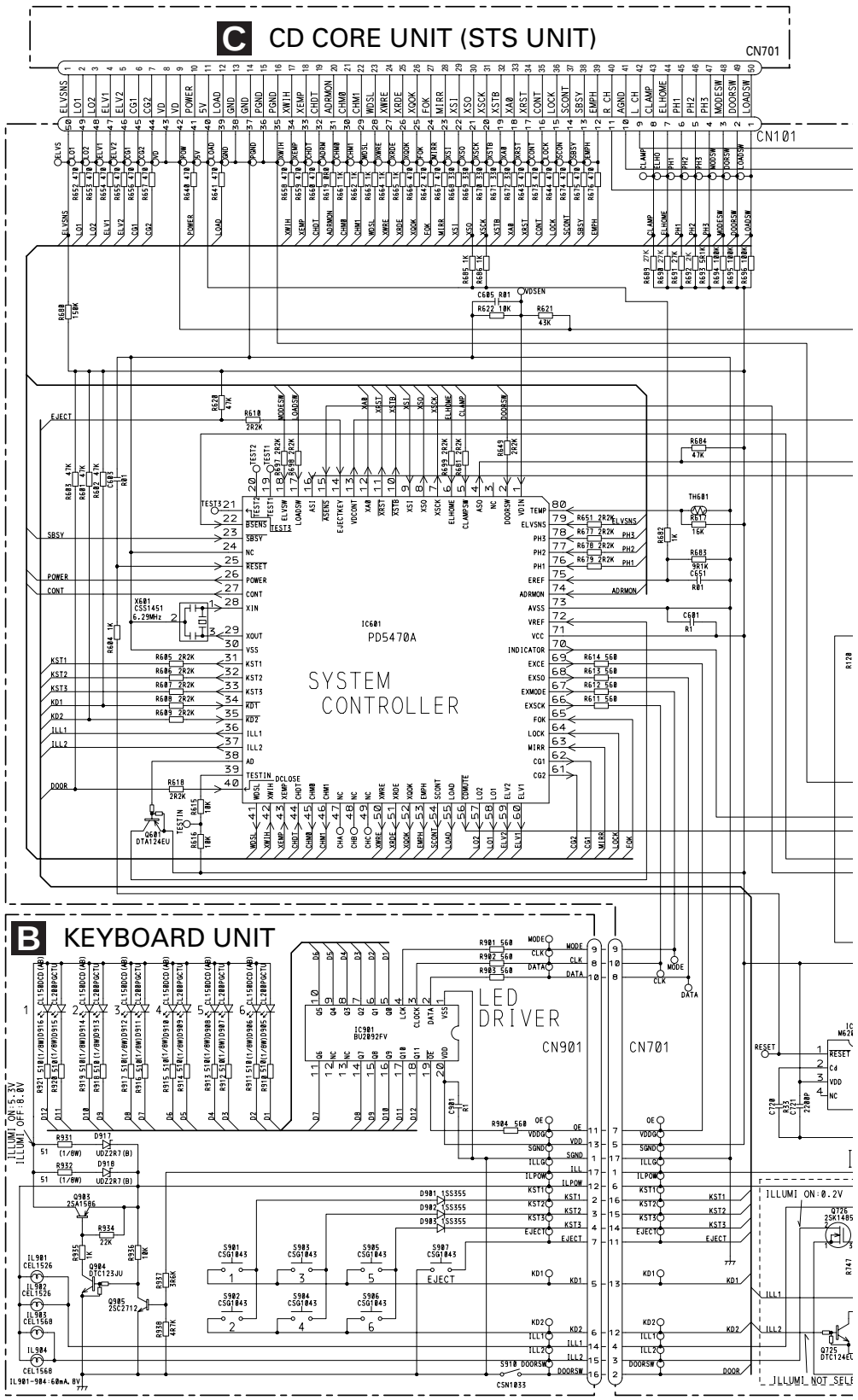



RE UNIT(STS UNIT)
A EXTENSION UNIT
KEYBOARD UNIT
8fs DF D/A LPF
IC601
AK4321VF
BCK
DATA
LRCK
XTLI
PD
DEMO
LCH
CN701
CN101
LPF
IC101
NJM4558MD
Q101
CD MUTE
CN102
CD-LCH
BUS
ASO
ASI
Q503
Q502
Q501
Q103
Q701
ASENS
ASENB
ILL CONT
Q702
BSENS
B.U
VD REGULATOR
Q708
Q709
Q711
Q710
VDD
VDCONT
VD
Q704
WDSL/CHMO/CHMI
XWRE/XRDE/XQOK
XWIH/XEMP/ADRMON/CHDT
CONT
EMPH
VM
REGULATOR
IC701
BA05SFP
POWER
TB/XSO/XSI/XSCK/XRST/SCONT
ELVSNS
S801
S802
S803
LOADSW
DOORSW
MODESW
CG1
CG2
V+5V
ELV1
ELV2
LO1
LO2
MAXSW
PH2
PH1
Q801
LOAD
ELHOME
CLAMP
X601
XIN
XOUT
SYSTEM
CONTROLLER
IC601
PD5470A
CDMUTE
PH3
CLAMPSW
DCLOSE
EJECTKEY
ILL1
ILL2
RESET
INDICATOR
EXSO
EXCSK
EXMODE
DATA
EXCK
IC701
M62007FP
H-BUS
14P
CN103
ILL POWER
Q705
Q706
Q707
Q703
Q720
Q712
Q723
Q713
Q726
Q724
Q725
DOORSW
ILPOW
EJECT
ILL1
ILL2
ILL
Q904
Q903
Q905
LED DRIVER
IC901 BU2092FV
DATA
CLK
MODE
KEY DATA
CN901
CN701

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".

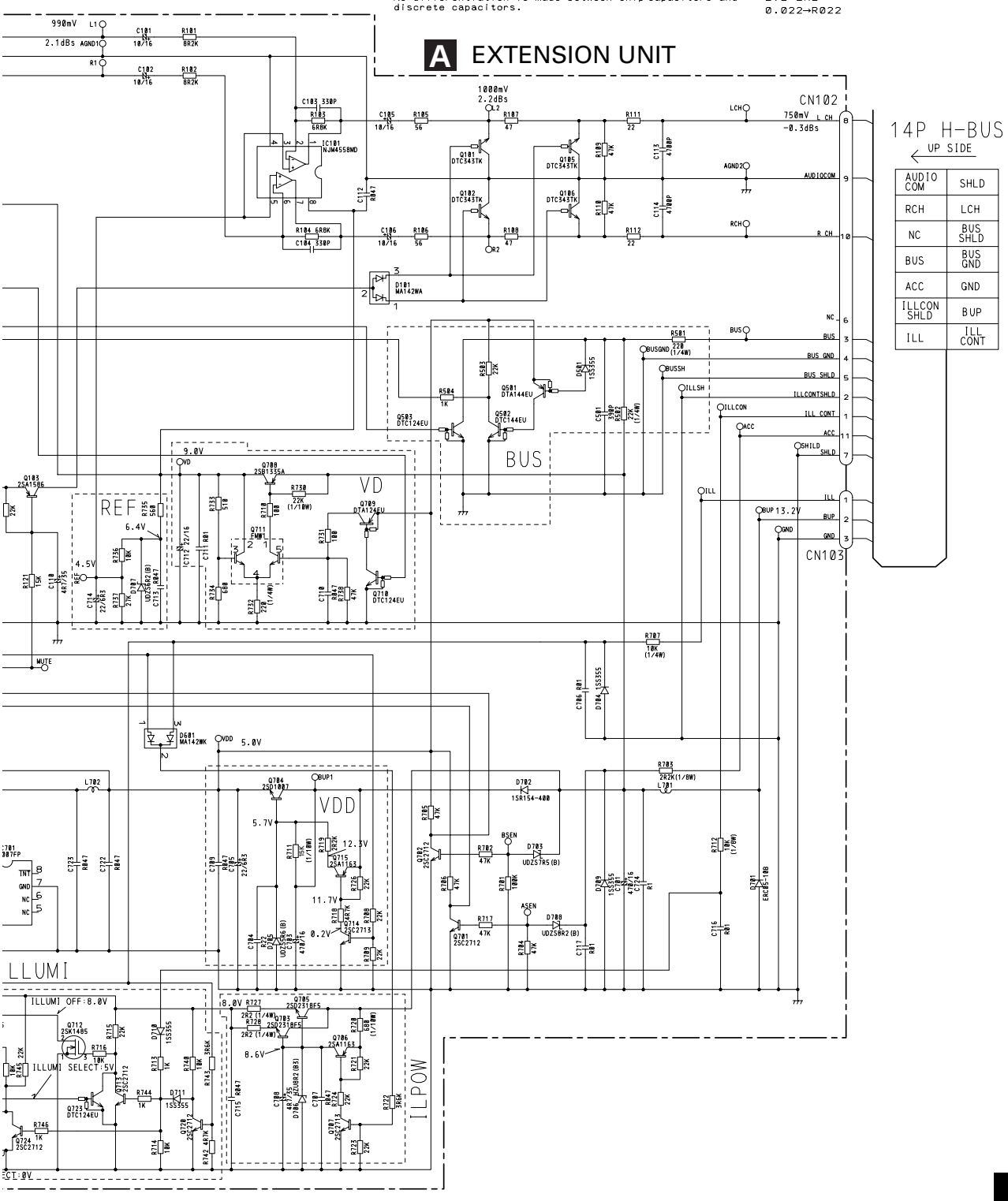


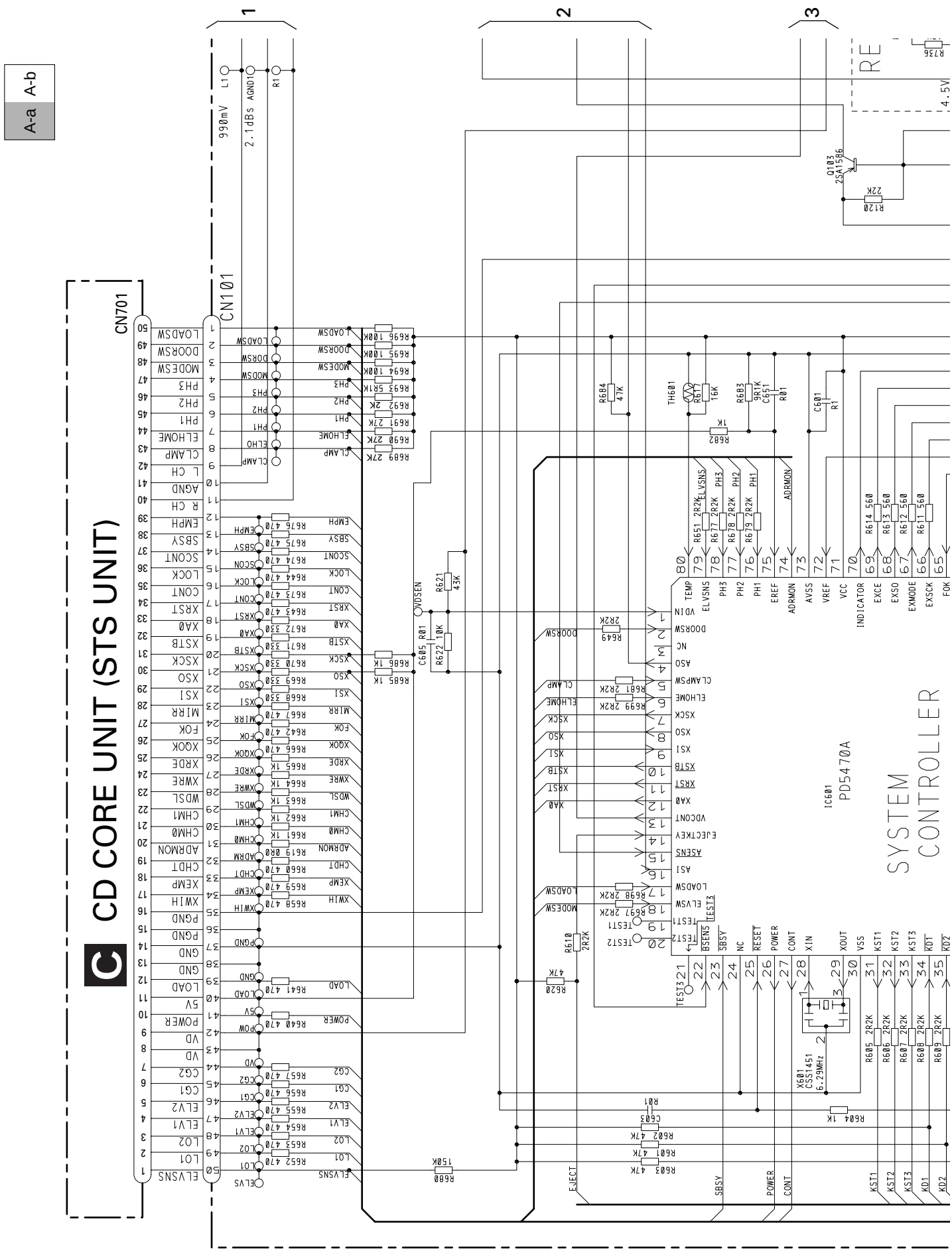


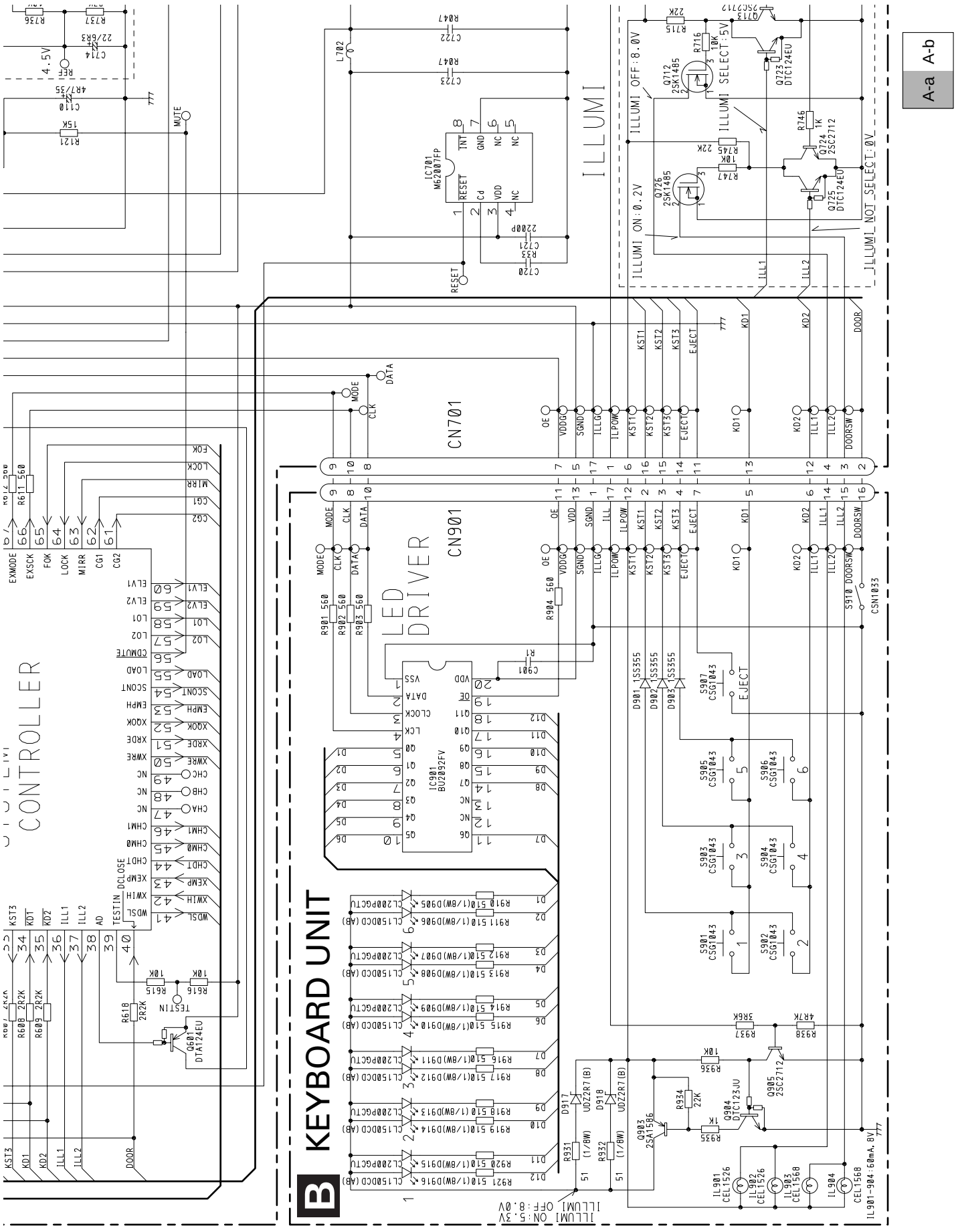
A-b

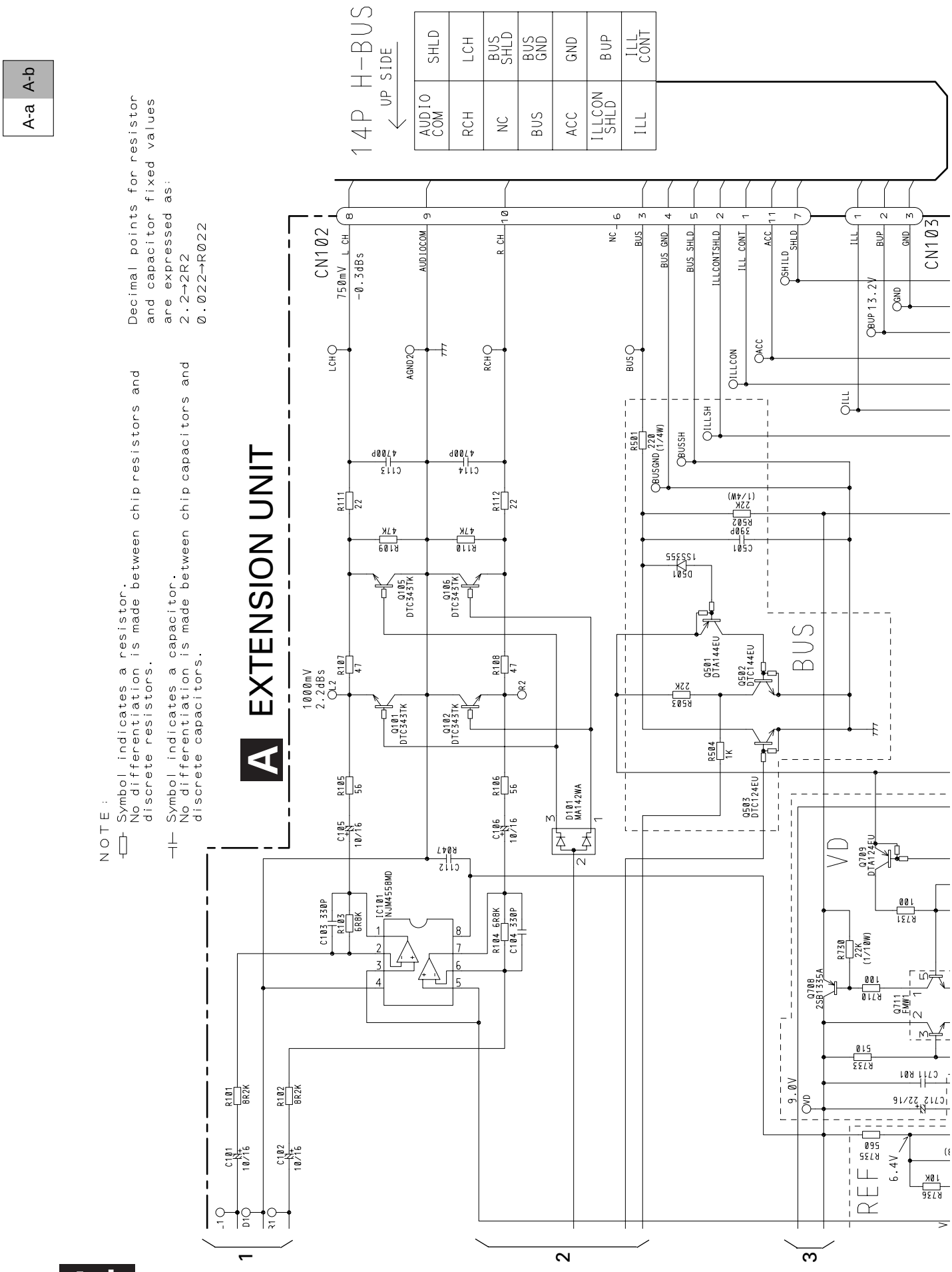
NOTE:
- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

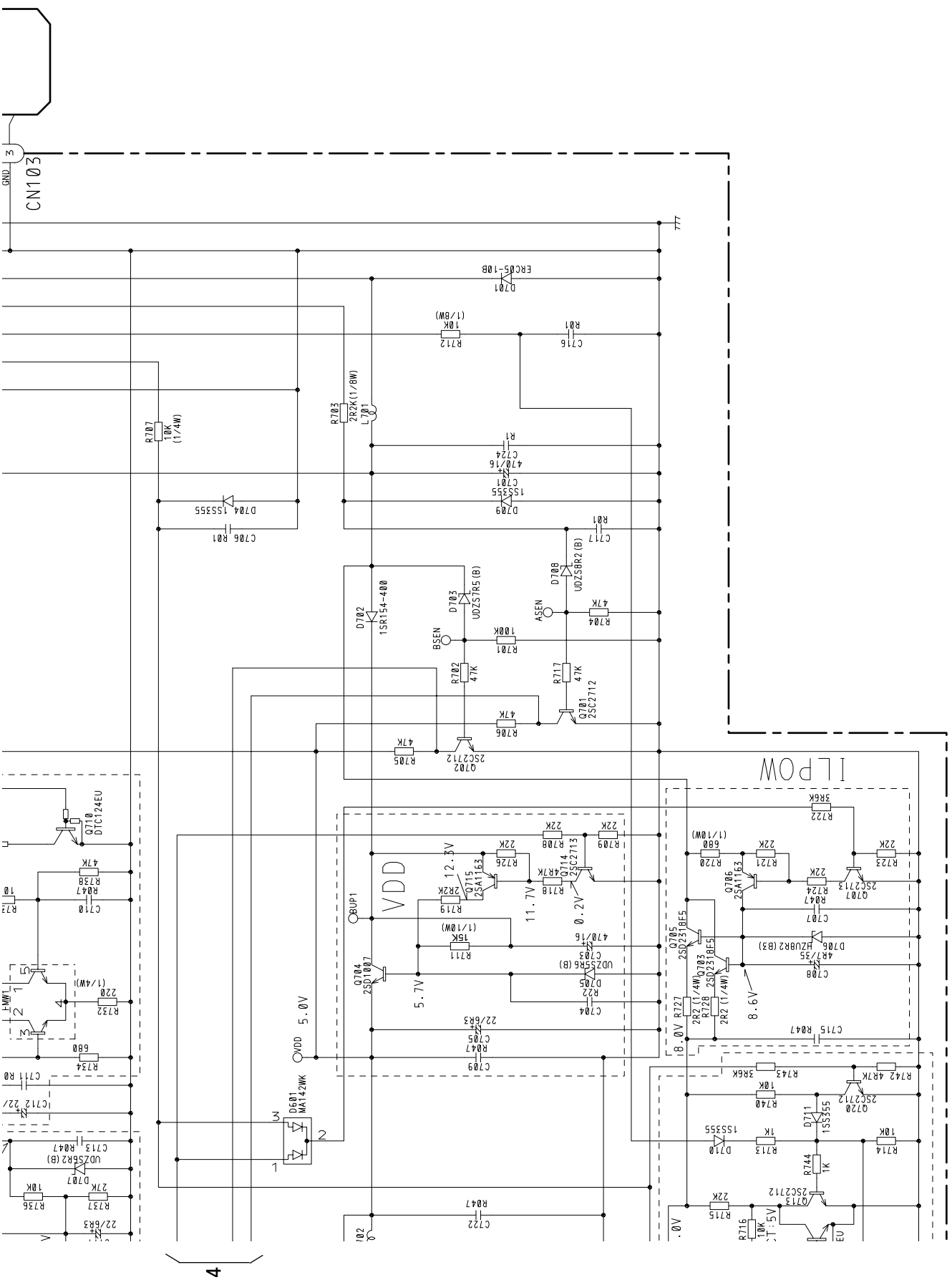
Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022




A-b
A-a
C CD CORE UNIT (STS UNIT)
CN701
CN101
990mV
2.1dBs
AGND
L1
R1
IC601
PD5470A
SYSTEM
CONTROLLER
X601
CSS1451
6.29MHz
Q103
2SA1586
TH601
R684 4.7K
R682 1K
R683 9R1K
C651 R01
C601 R1
R620 47K
R610 2R2K
R604 1K
C603 R01
R621 43K
C605 R01
R622 10K
R685 1K
R688 150K
R720 22K
R736
4.5V
VDSEN
EJECT
SBSY
POWER
CONT
KST1
KST2
KST3
KD1
KD2
LOADSW
DOORSW
MODESW
PH3
PH2
PH1
ELHOME
CLAMP
L CH
AGND
R CH
EMPH
SBSY
SCONT
LOCK
CONT
XRST
XA0
XSTB
XSCK
XSO
XSI
MIRR
FOK
XOOK
XRDE
XWRE
WDSL
CHM1
CHM0
ADRMON
CHDT
XEMP
XWIH
PGND
GND
LOAD
5V
POWER
VD
CG2
CG1
ELV2
ELV1
LO2
LO1
ELVSNS
TEMP
VDIN
NC
ASO
ELECTKEY
ASENS
ASI
VDCONT
TEST1
TEST2
TEST3
BSENS
NC
RESET
POWER
CONT
XIN
XOUT
VSS
INDICATOR
EXCE
EXSO
EXMODE
EXSCK
FOK
VCC
VREF
AVSS
ADRMON
EREF

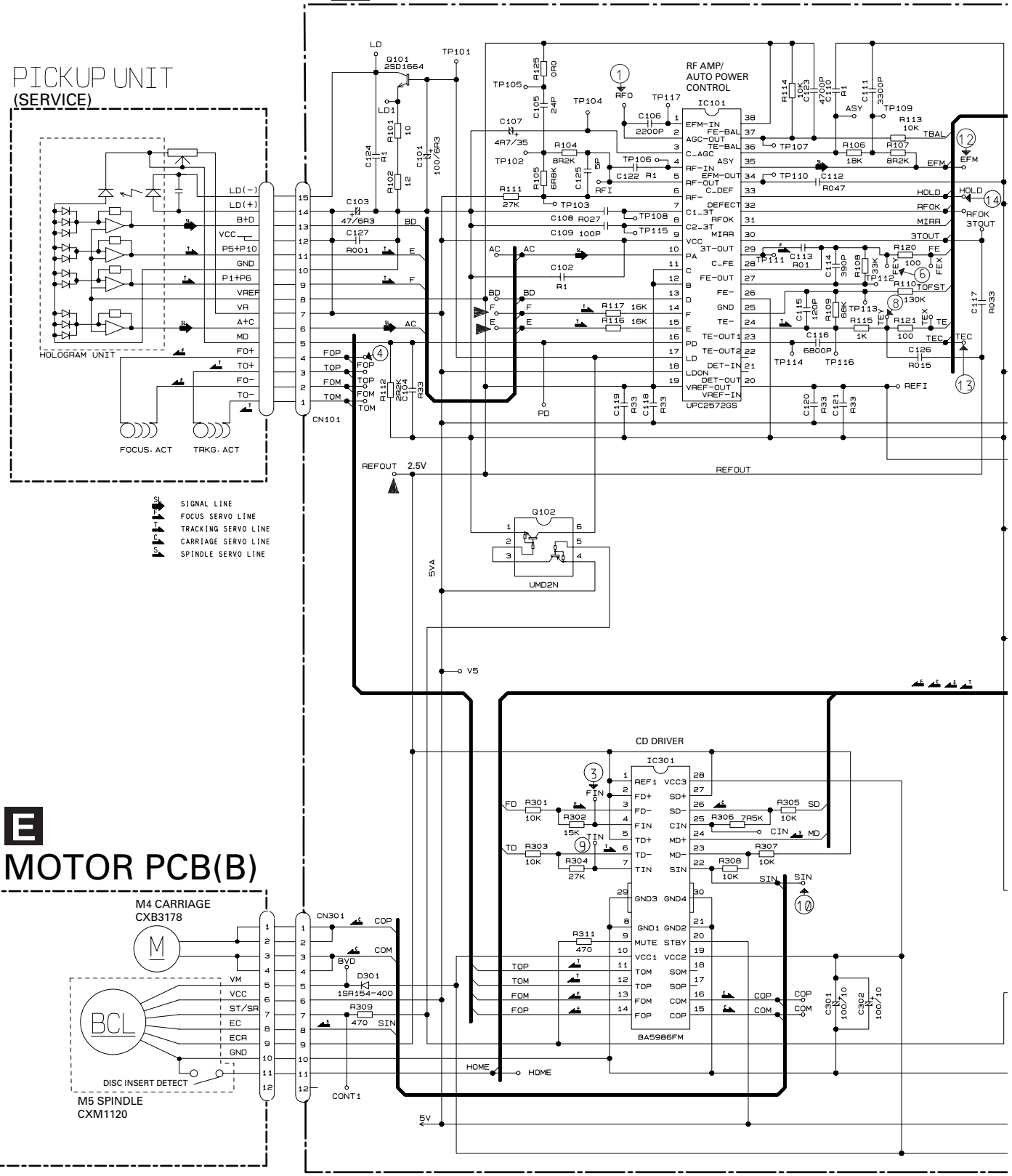

B KEYBOARD UNIT
CN701
CN901
LED DRIVER
CONTROLLER
ILLUMI
ILLUMI OFF:8.0V
ILLUMI ON:0.2V
ILLUMI SELECT:5V
ILLUMI NOT SELECT:0V
IC701 M62007FP
IC901 BU2092FV
Q712 2SK1485
Q713 2SC3713
Q723 DTC124EU
Q724 2SC2712
Q725 DTC124EU
Q726 2SK1485
Q901 DTA124EU
Q903 2SA1586
Q904 DTC123JU
Q905 2SC2712
D901 1SS355
D902 1SS355
D903 1SS355
D917 UDZ2R7(B)
D918 UDZ2R7(B)
S901 CSG1043
S902 CSG1043
S903 CSG1043
S904 CSG1043
S905 CSG1043
S906 CSG1043
S907 CSG1043
EJECT
S910 DOORSW
CSN1033
IL901 CEL1526
IL902 CEL1526
IL903 CEL1568
IL904 CEL1568
IL901-904:60mA.8V
ILLUMI OFF:8.0V
ILLUMI ON:5.3V
MUTE
RESET
DATA
MODE
CLK
DOOR
KST1
KST2
KST3
EJECT
KD1
KD2
ILL1
ILL2
DOORSW
A-a
A-b

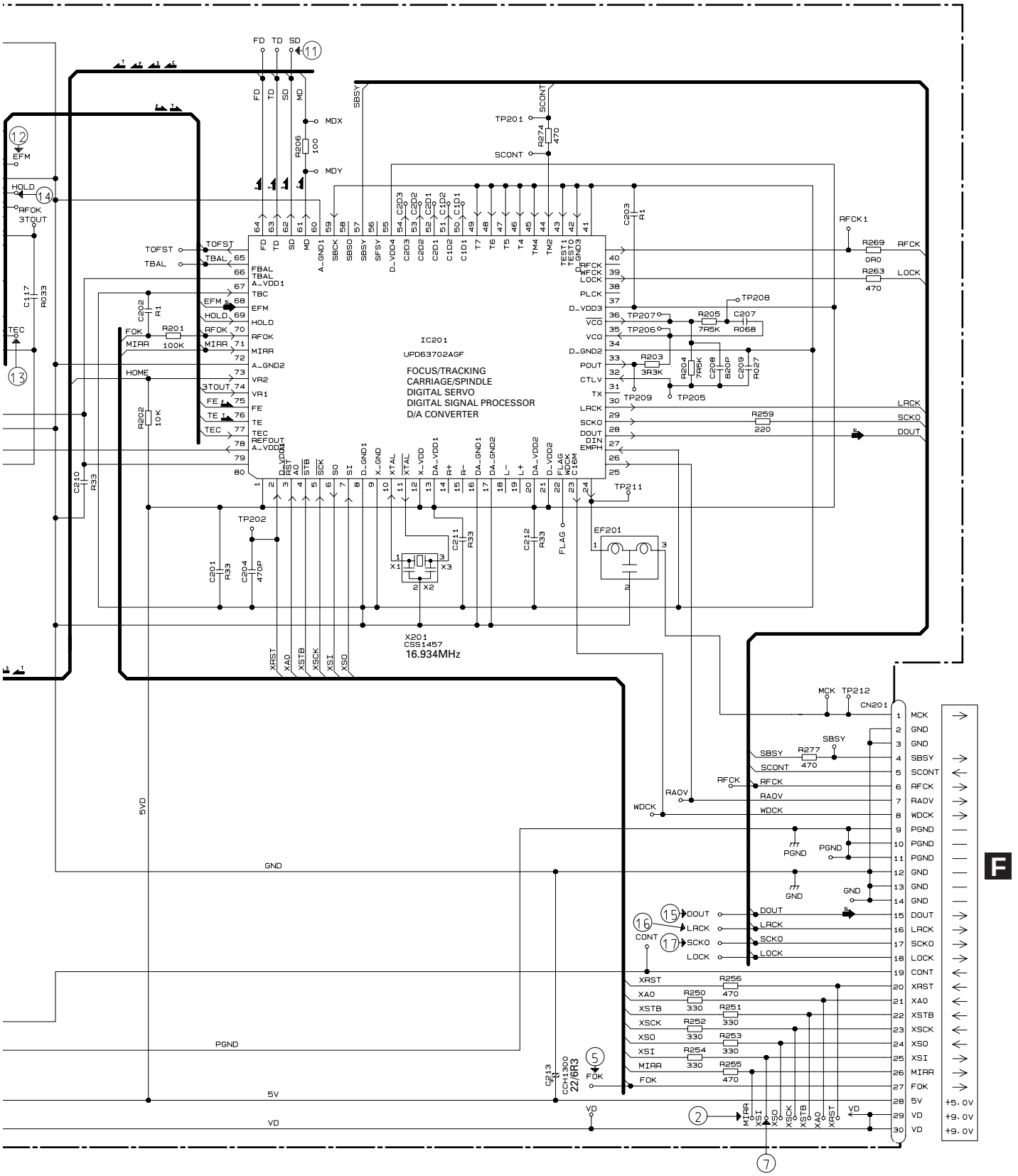

A-a A-b
14P H-BUS
UP SIDE
AUDIO COM
RCH
NC
BUS
ACC
ILLCON SHLD
ILL
SHLD
LCH
BUS SHLD
BUS GND
GND
BUP
ILL CONT
Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022
NOTE:
Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.
A EXTENSION UNIT
CN102
CN103
750mV -0.3dBs
1000mV 2.2dBs
BUS
VD
9.0V
6.4V
REF
Q105 DTC343TK
Q106 DTC345TK
Q101 DTC343TK
Q102 DTC345TK
Q501 DTA144EU
Q502 DTC144EU
Q503 DTC124EU
Q709 DTA124EU
Q708 2SB1335A
Q711 FMW1
IC101 NJM4558MD
D101 MA142WA
D501 1SS355


CN103
GND
VDD
5.0V
12.3V
11.7V
0.2V
5.7V
18.0V
8.6V
BUP1
BSEN
ASEN
ILPOW
D701 ERC05-10B
D702 1SR154-400
D703 UDZS7R5(B)
D708 UDZS8R2(B)
D704 1SS355
D709 1SS355
D705 UDZS5R6(B)
D706 HZUBR2(B3)
D707 UDZS6R2(B)
D710 1SS355
D711 1SS355
Q701 2SC2712
Q702 2SC2712
Q703 2SD2318F5
Q704 2SD1007
Q705 2SD2318F5
Q706 2SA1163
Q707 2SC2713
Q710 DTC124EU
Q714 2SC2713
Q715 2SA1163
Q720 2SC2712
Q713 2SC2712
D601 MA142WK
R707 10K (1/4W)
R703 2R2K(1/8W)
L701
R712 10K (1/8W)
C716 R01
C724 470/16
C706 R01
C717 R01
R704 47K
R701 100K
R702 47K
R717 47K
R706 47K
R705 47K
R722 3R6K
R723 22K
R724 22K
R725 22K
R726 22K
R708 22K
R709 22K
R720 680 (1/10W)
R721 22K
R719 22R2K
R718 47R1K
R711 15K (1/10W)
R727 2R2 (1/4W)
R728 2R2 (1/4W)
R743 3R6K
R742 4R7K
R740 10K
R744 1K
R715 22K
R716 10K
R713 1K
R714 10K
R738 47K
R739 10K
R737 27K
R736 10K
R734 680
R732 220
R733 220
C710 R047
C707 R047
C708 4R7/35
C715 R047
C709 R047
C705 22/6R3
C704 R22
C703 470/16
C722 R047
C712 22/6R3
C713 R047
C711 R0
R047 R047

3.2 CD CORE UNIT(SERVO UNIT)

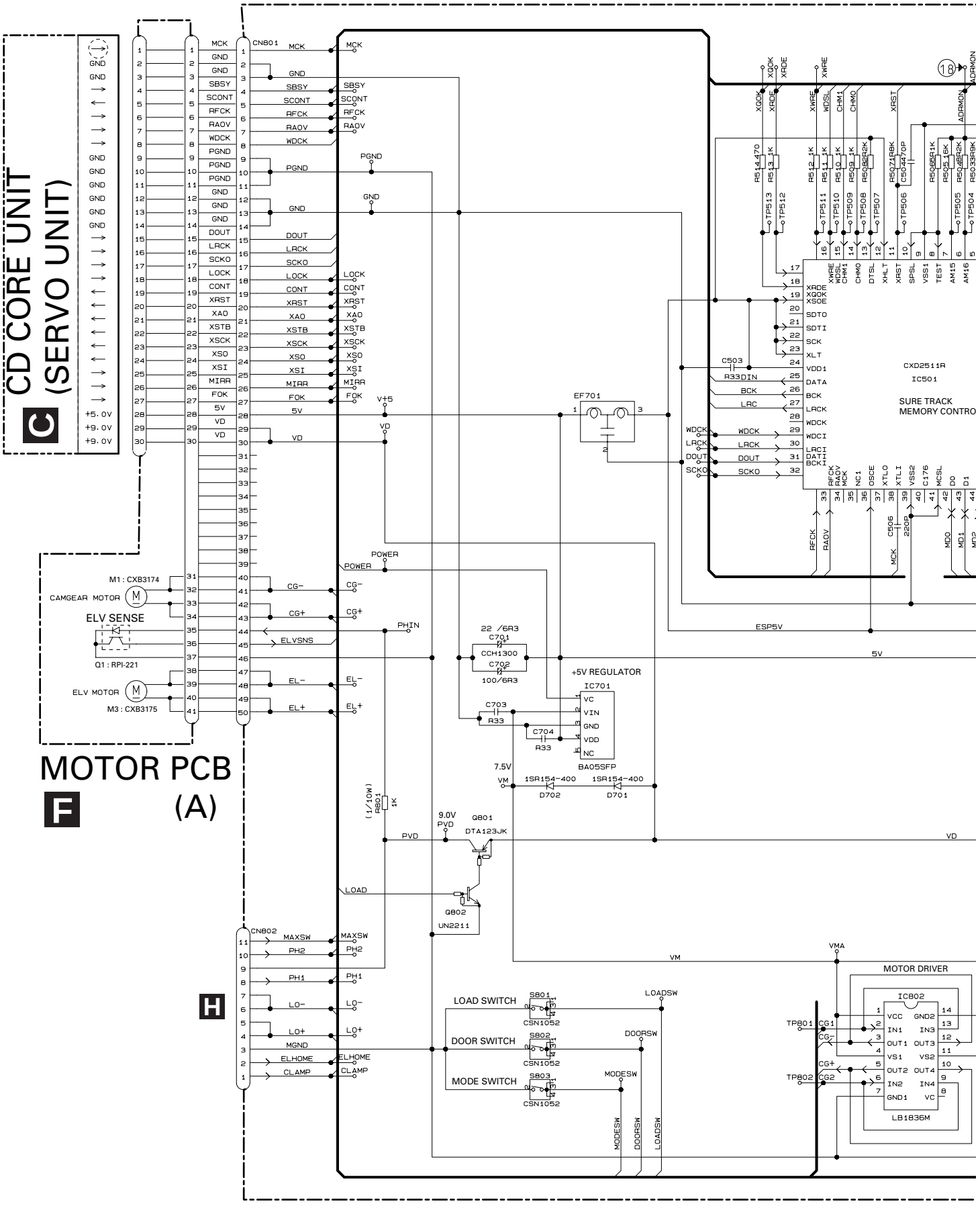
C CD CORE UNIT(SERVO UNIT)

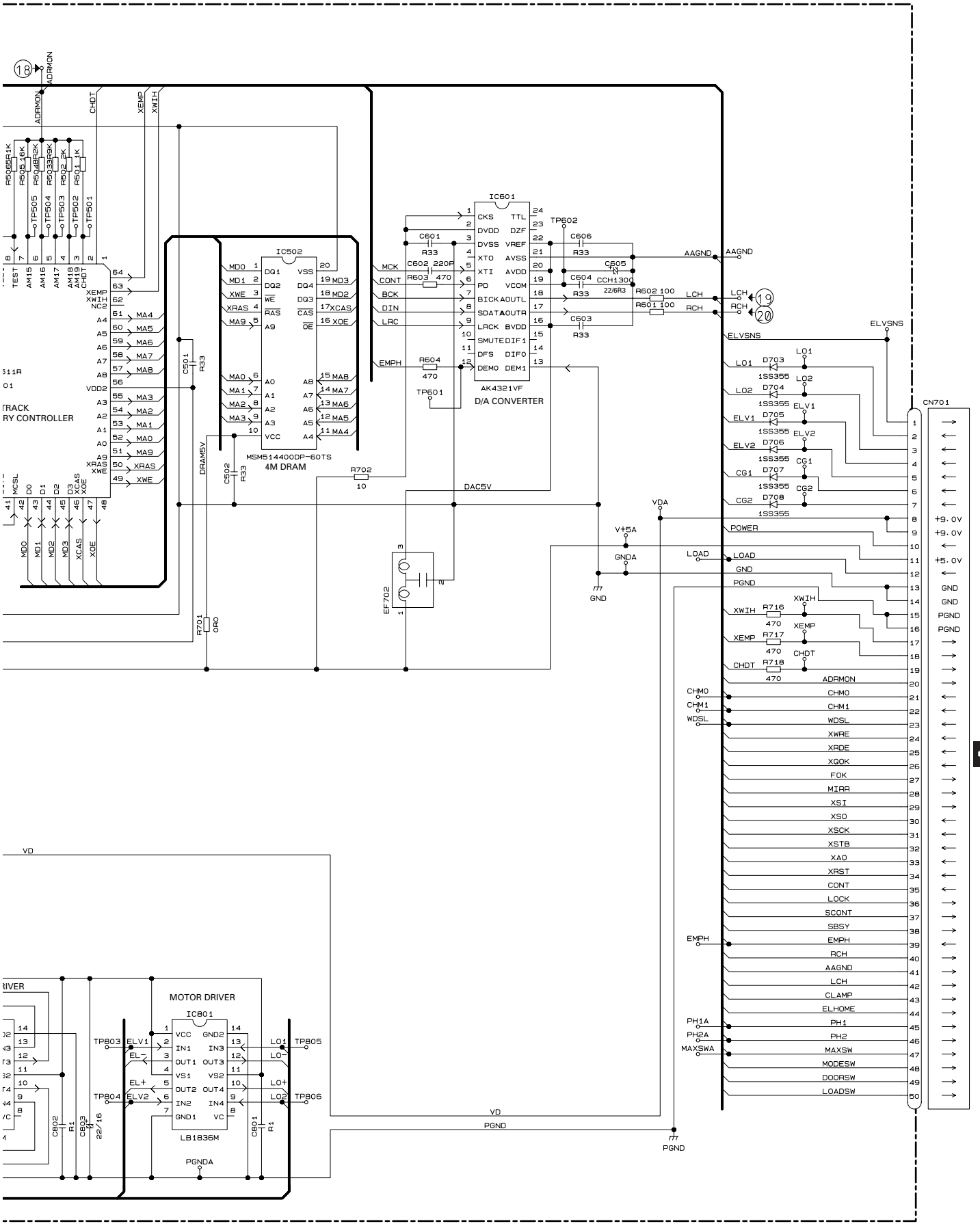



IC201
UPD63702AGF
FOCUS/TRACKING
CARRIAGE/SPINDLE
DIGITAL SERVO
DIGITAL SIGNAL PROCESSOR
D/A CONVERTER
X201
CSS1457
16.934MHz
CN201
MCK
GND
SBSY
SCONT
RFCK
RAOV
WDCK
PGND
DOUT
LRCK
SCKO
LOCK
CONT
XRST
XAO
XSTB
XSCK
XSO
XSI
MIRR
FOK
5V
VD
TOFST
TBAL
EFM
HOLD
RFOK
MIRR
FE
TE
TEC
HOME
3TOUT
MDX
MDY
LRCK
SCKO
DOUT

3.3 CD CORE UNIT(STS UNIT)

D CD CORE UNIT(STS UNIT)

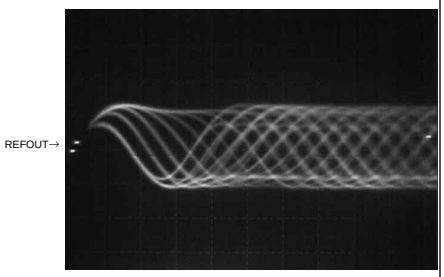



IC601
AK4321VF
D/A CONVERTER
IC502
MSM514400DP-60TS
4M DRAM
MOTOR DRIVER
IC801
LB1836M
CN701
CN101
TRACK
RY CONTROLLER
ADRMON
CHDT
XEMP
XWIH
AAGND
AGND
LCH
RCH
ELVSNS
LO1
LO2
ELV1
ELV2
CG1
CG2
POWER
LOAD
GND
PGND
VDA
V+5A
GNDA
DAC5V
DRAM5V
VD
PGND
PGNDA
CHMO
CHM1
WDSL
XWRE
XRDE
XQOK
FOK
MIRR
XSI
XSO
XSCK
XSTB
XAO
XRST
CONT
LOCK
SCONT
SBSY
EMPH
CLAMP
ELHOME
PH1A
PH2A
MAXSWA
PH1
PH2
MAXSW
MODESW
DOORSW
LOADSW

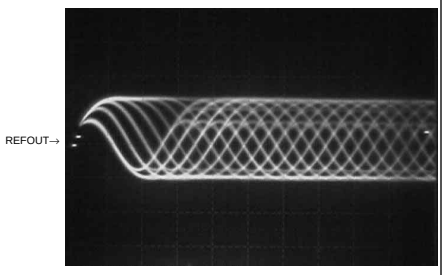
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFOUT:2.5V

● Waveforms

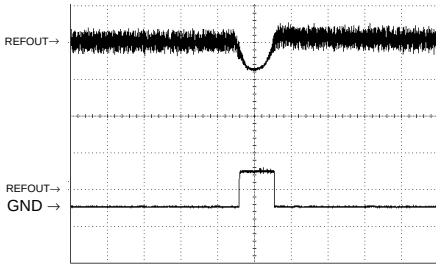
① RFO 0.5V/div. 0.2µs/div.
Normal mode: play



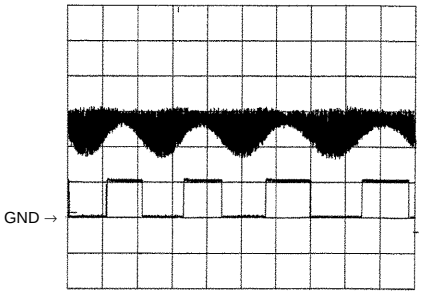
① RFO 0.5V/div. 0.5µs/div.
Test mode



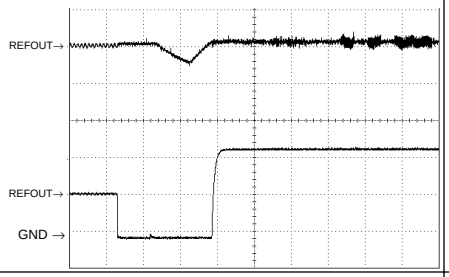
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Normal mode: The defect part passes 500µs/div.



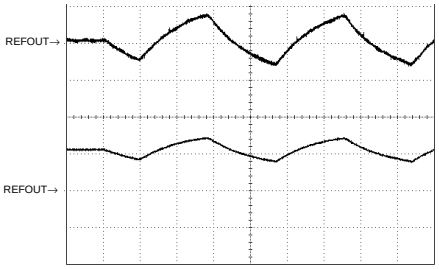
① CH1: RFO 1V/div.
② CH2: MIRR 5V/div. 0.5ms/div.
Test mode: Tracking open



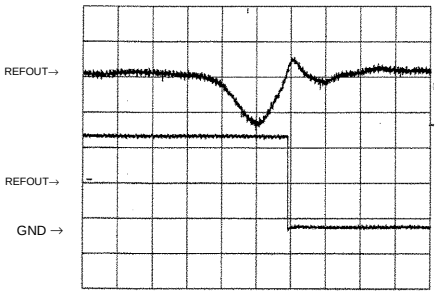
③ CH1: FIN 0.5V/div.
⑤ CH2: FOK 2V/div. 0.2s/div.
Normal mode: Focus close



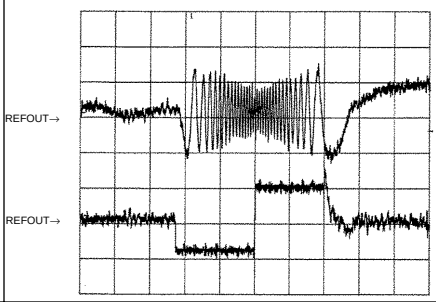
③ CH1: FIN 0.5V/div.
④ CH2: FOP 2V/div. 0.2s/div.
Test mode: No disc, Focus close



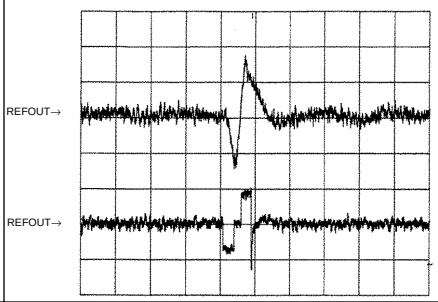
⑥ CH1: FEY 0.5V/div.
⑦ CH2: XSI 2V/div. 1ms/div.
Normal mode: Focus close



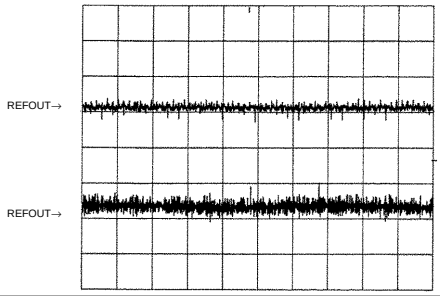
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: 32 tracks jump (FWD)



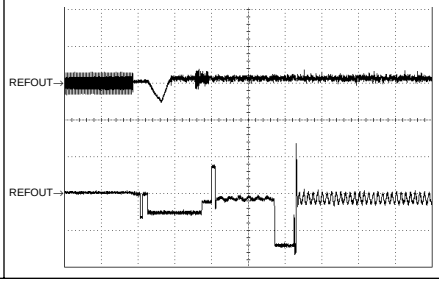
⑧ CH1: TEY 0.5V/div.
⑨ CH2: TIN 0.5V/div. 0.5ms/div.
Test mode: Single jump (FWD)



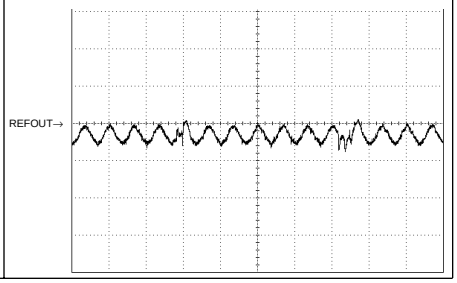
⑥ CH1: FEY 0.1V/div.
③ CH2: FIN 0.2V/div. 20ms/div.
Normal mode: Play



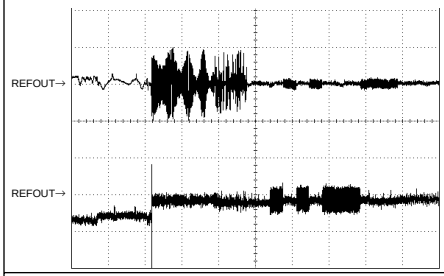
③ CH1: FIN 0.5V/div.
⑩ CH2: SIN 1V/div. 0.5s/div.
Normal mode: Focus close



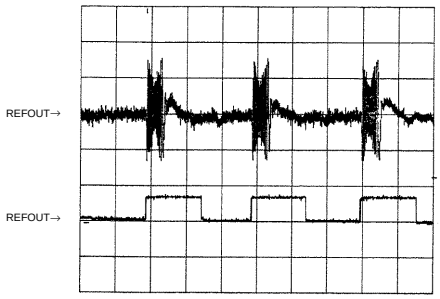
⑩ SIN 0.5V/div. 0.1s/div.
Normal mode: Play



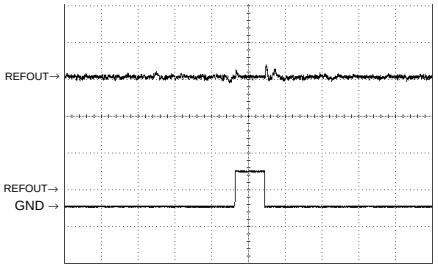
⑧ CH1: TEY 0.5V/div.
⑥ CH2: FEY 0.1V/div. 0.2s/div.
Normal mode: AGC after focus close



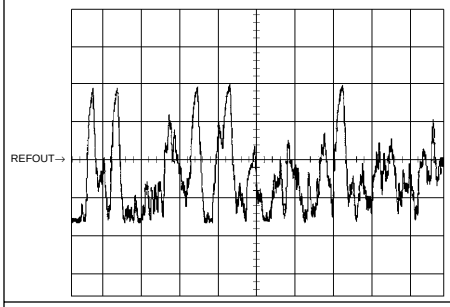
⑧ CH1: TEY 0.5V/div.
⑪ CH2: SD 0.5V/div. 5ms/div.



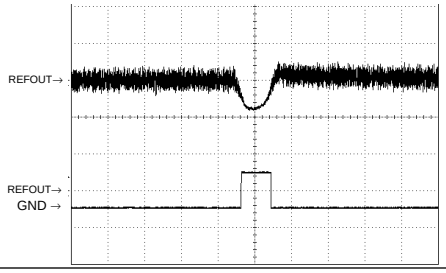
③ CH1: FIN 1V/div.
⑭ CH2: HOLD 5V/div. 500µs/div.
Normal mode: The defect part passes 800µm



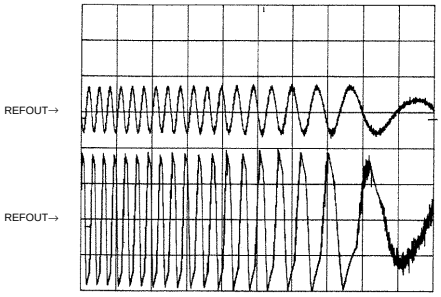
⑩ SIN 1V/div. 10ms/div.
Long Search



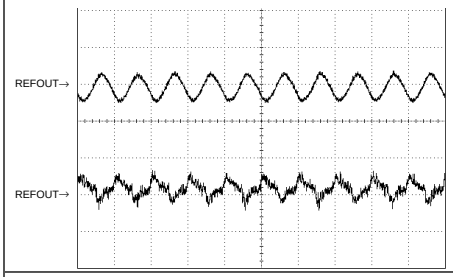
① CH1: RFO 1V/div.
⑭ CH2: HOLD 5V/div. 500µs/div.
Normal mode: The defect part passes 800µm



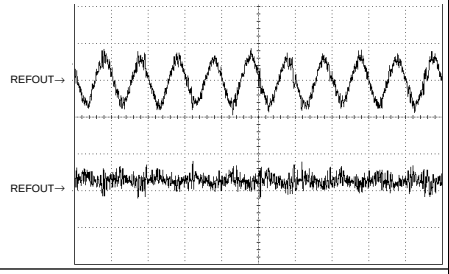
⑧ CH1: TEY 1V/div.
⑬ CH2: TEC 1V/div. 2ms/div.
Test mode: Focus close
Tracking open



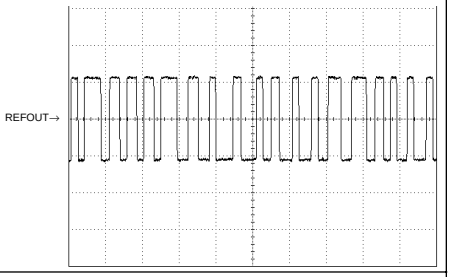
⑥ CH1: FEY 0.2V/div.
③ CH2: FIN 0.5V/div. 1ms/div.
Normal mode: During AGC



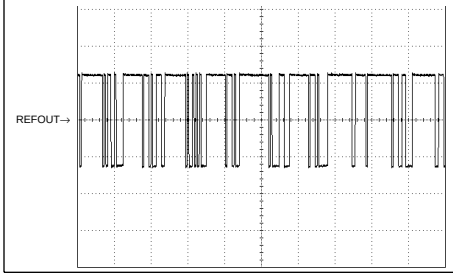
⑧ CH1: TEY 0.2V/div.
⑨ CH2: TIN 0.5V/div. 1ms/div.
Normal mode: During AGC



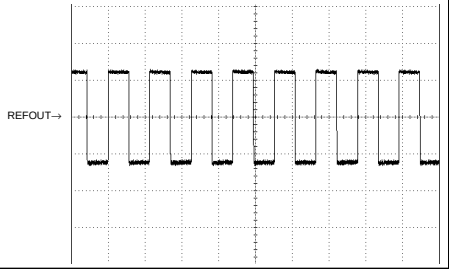
⑫ EFM 1V/div. 2µs/div.
Play



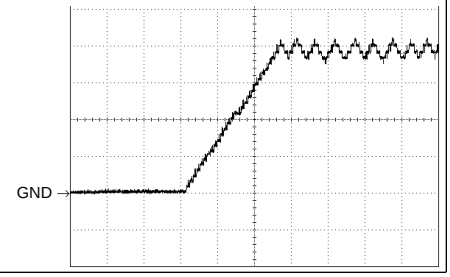
⑮ Dout 2V/div. 5µs/div.
Play

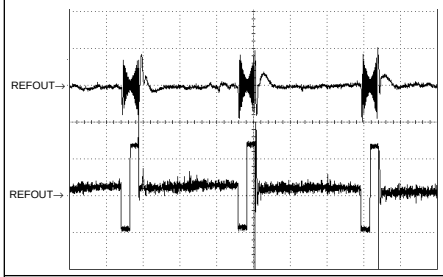
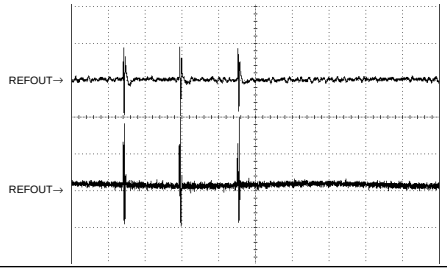
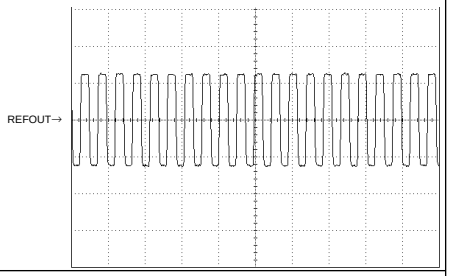
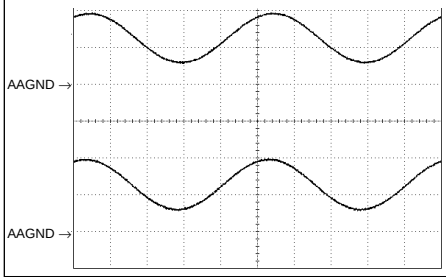


⑯ LRCK 2V/div. 10µs/div.

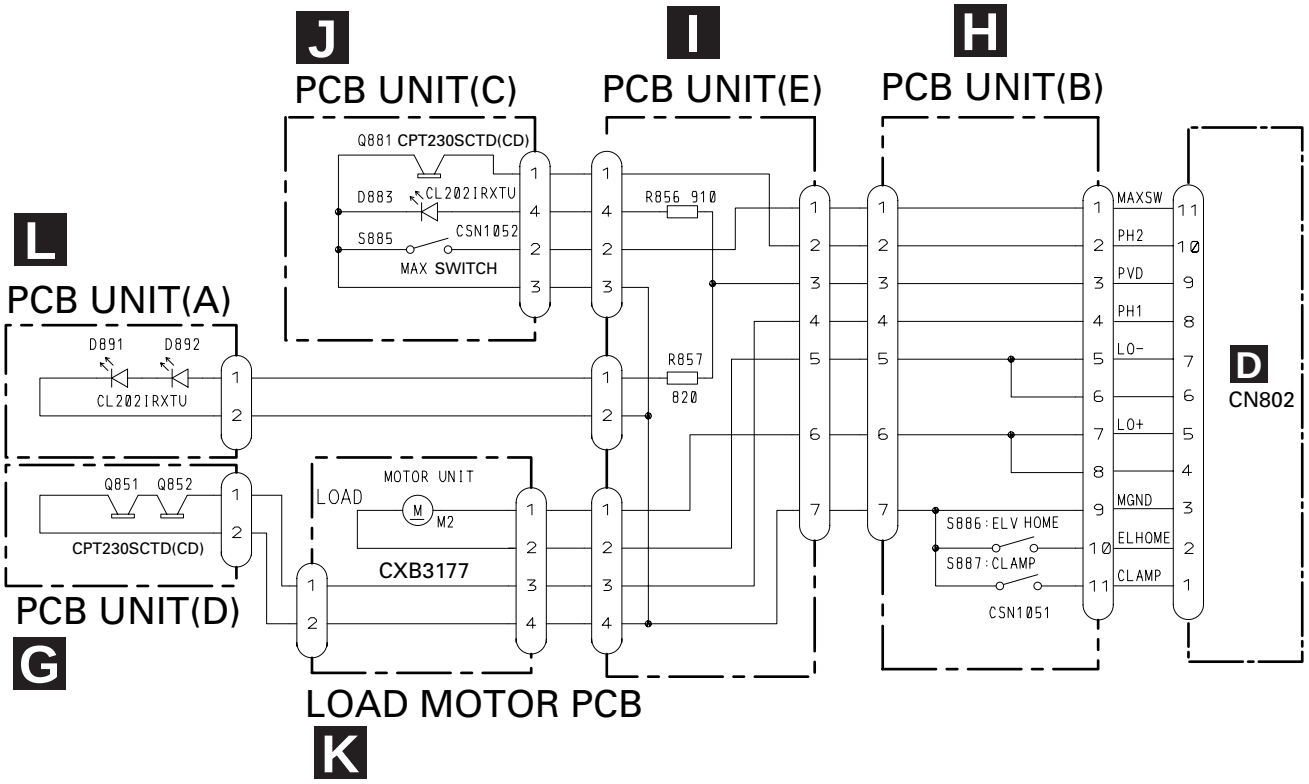


⑱ ADRMON 1V/div. 1s/div.
Normal mode: Starting play



⑧ CH1: TEY 0.5V/div. ⑨ CH2: TIN 0.5V/div. 5ms/div. Test mode: 100 tracks jump(FWD) 	⑧ CH1: TEY 0.5V/div. ⑨ CH2: TIN 0.5V/div. 10ms/div. Normal mode: Play 	⑰ SCKO 2V/div. 500ns/div. Play 
⑳ CH1: RCH 2V/div. ⑲ CH2: LCH 2V/div. 200µs/div. Normal mode: PLAY (0dB,1kHz) 		

3.4 PCB UNIT(A,B,C,D,E), LOAD MOTOR PCB

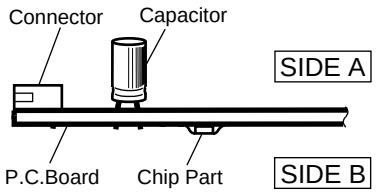


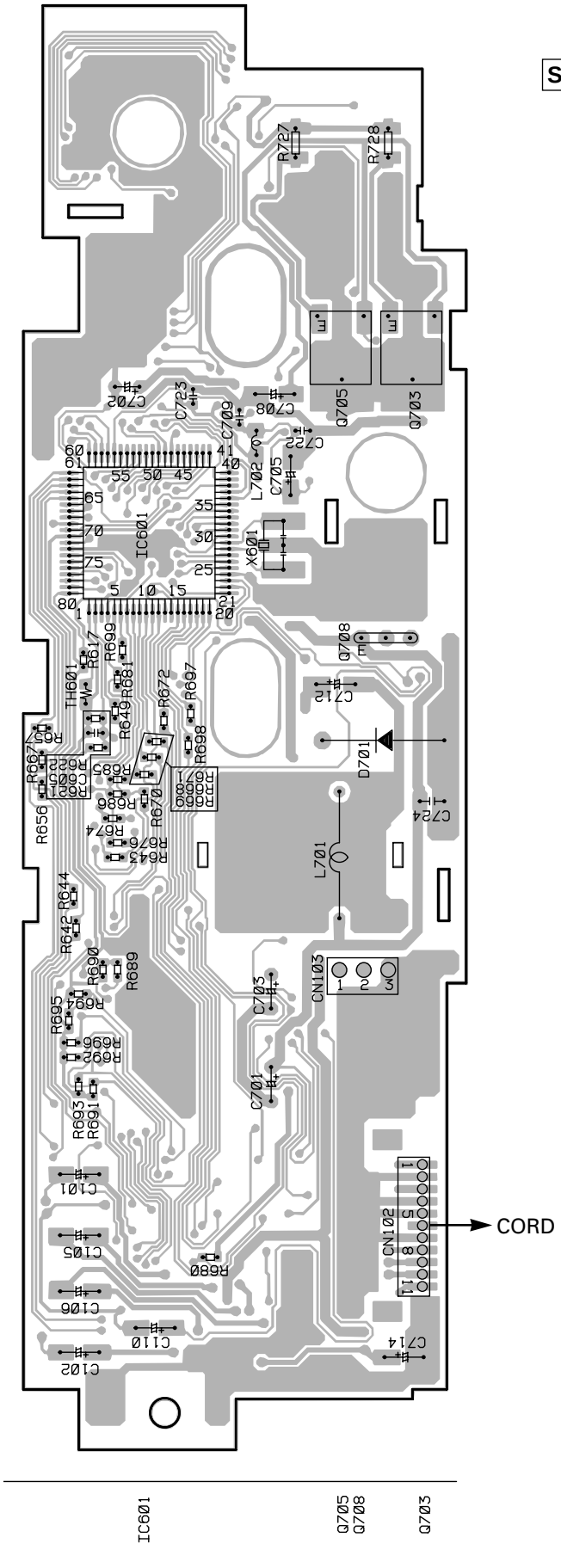
4. PCB CONNECTION DIAGRAM

4.1 EXTENSION UNIT

NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams

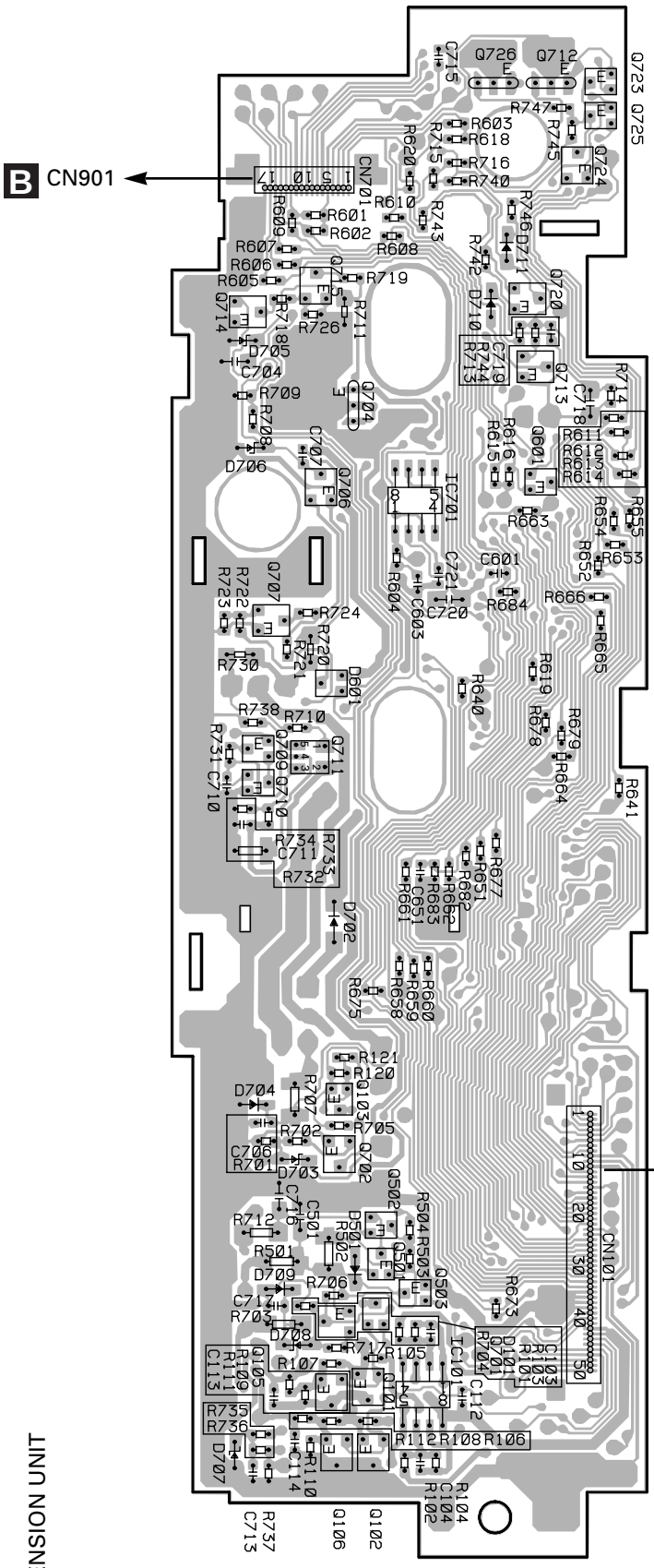




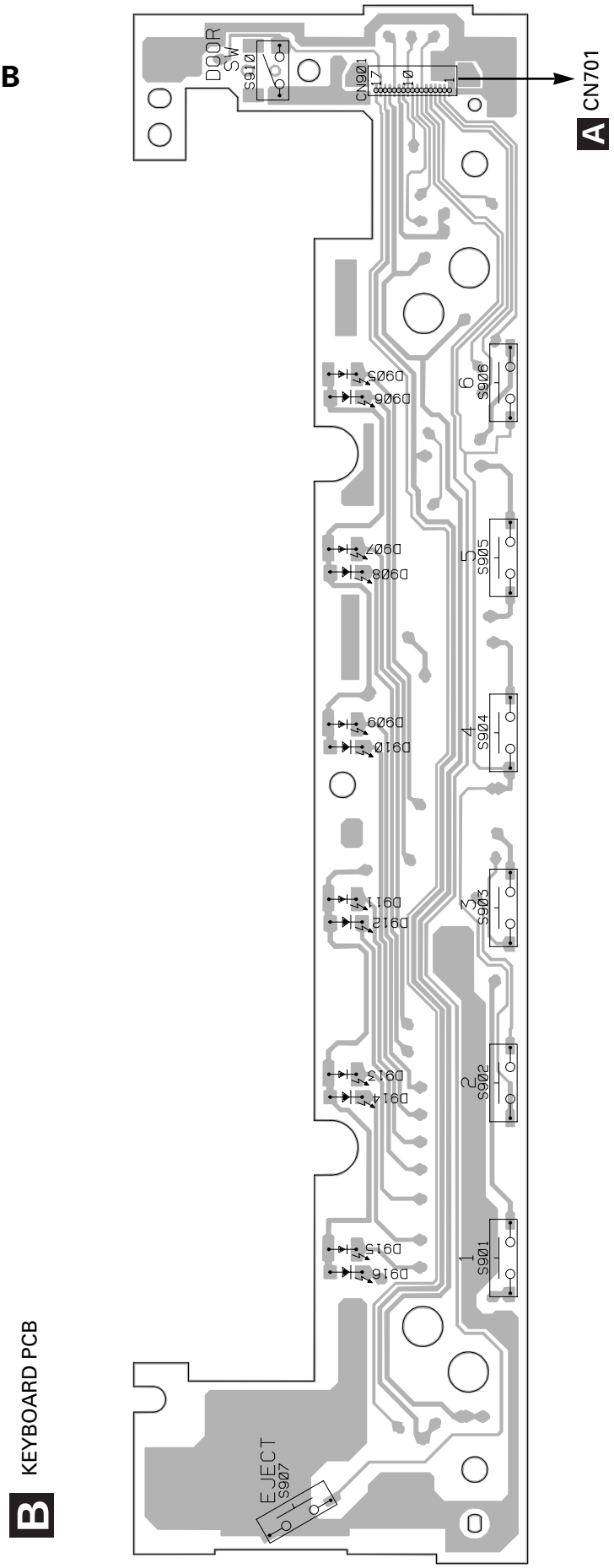
EXTENSION UNIT

A

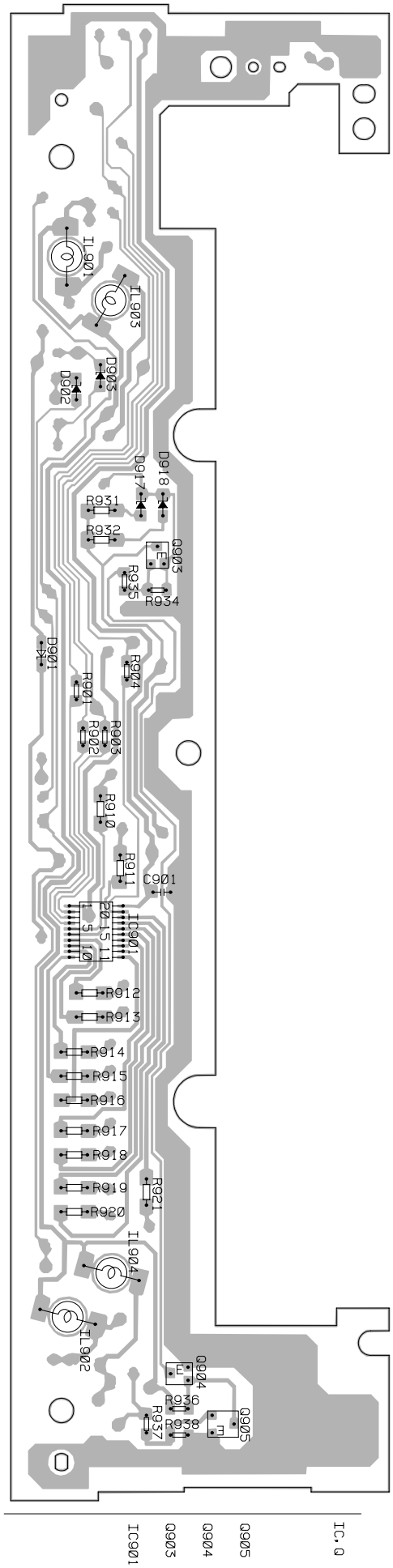
SIDE B


B CN901
D CN701
A EXTENSION UNIT
IC, Q
Q723 Q725
Q724
Q720 Q713
Q712 Q601
Q701
Q726
IC701 IC101
Q503
Q502 Q501 Q101
Q704 Q103 Q702
Q706 Q102
Q715 Q711 Q106
Q709 Q710
Q707 Q105
Q714

4.2 KEYBOARD PCB



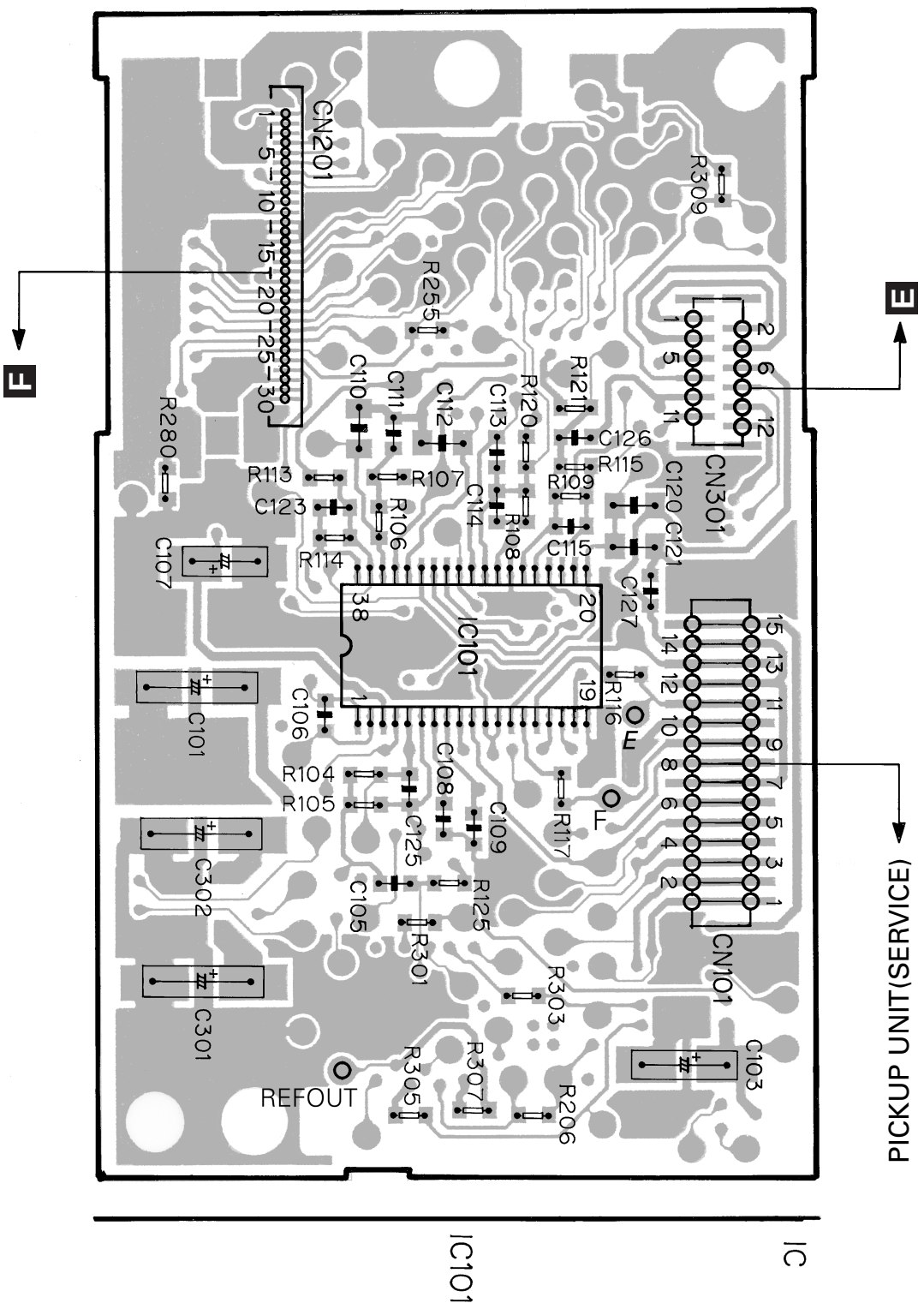
SIDE B



B KEYBOARD PCB

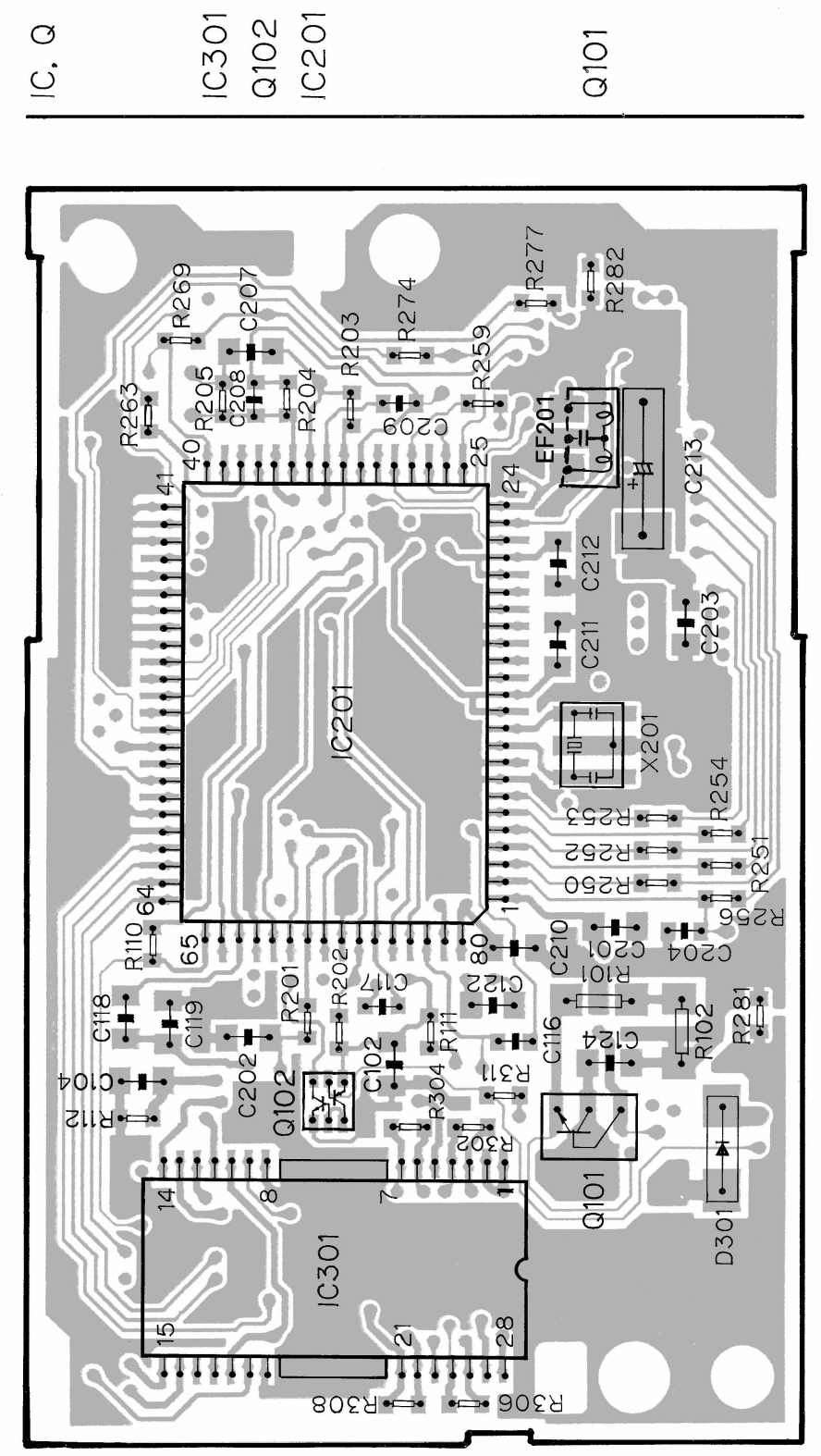
4.3 CD CORE UNIT(SERVO UNIT)

SIDE A



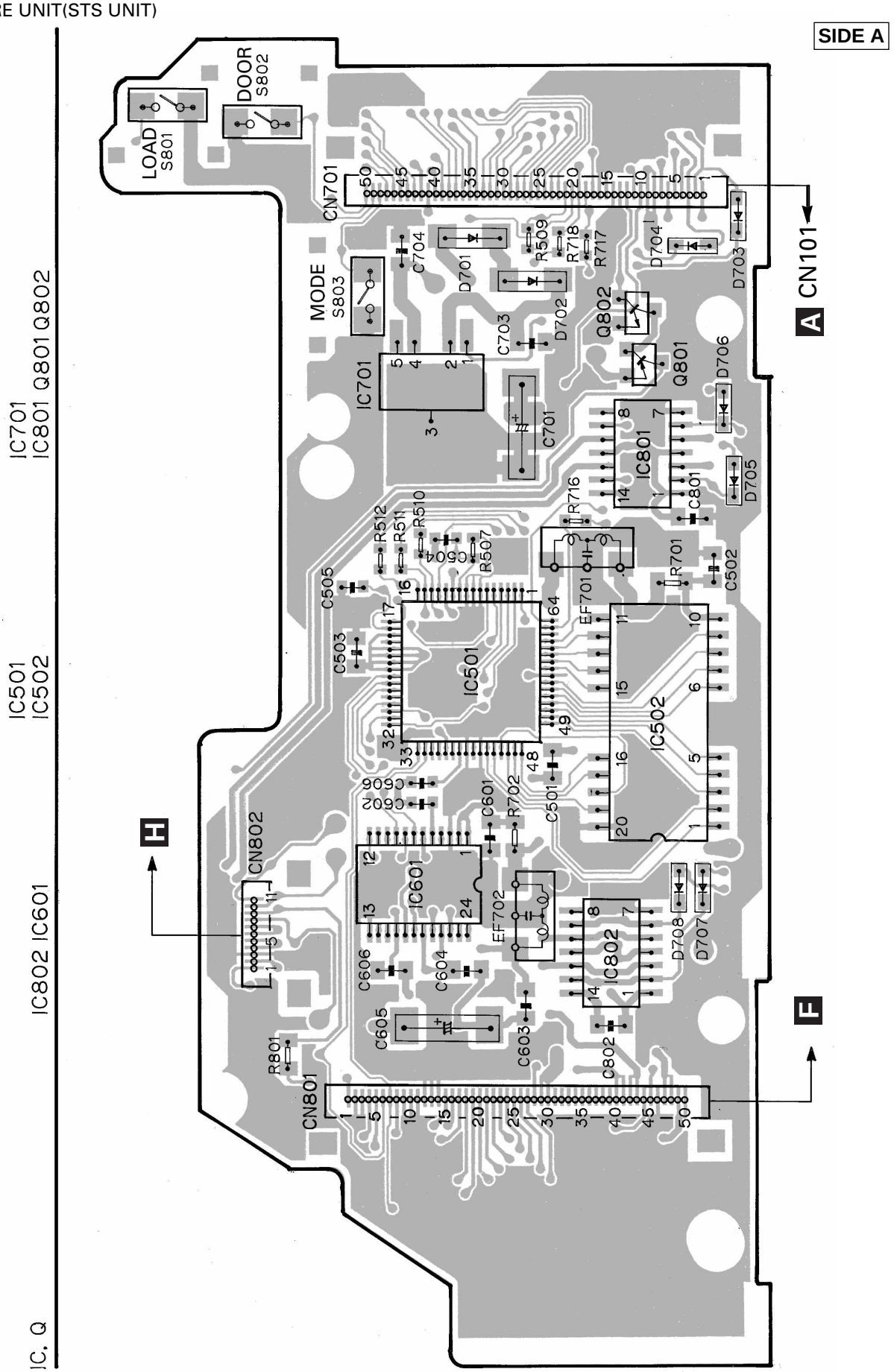
SIDE B

C CD CORE UNIT(SERVO UNIT)



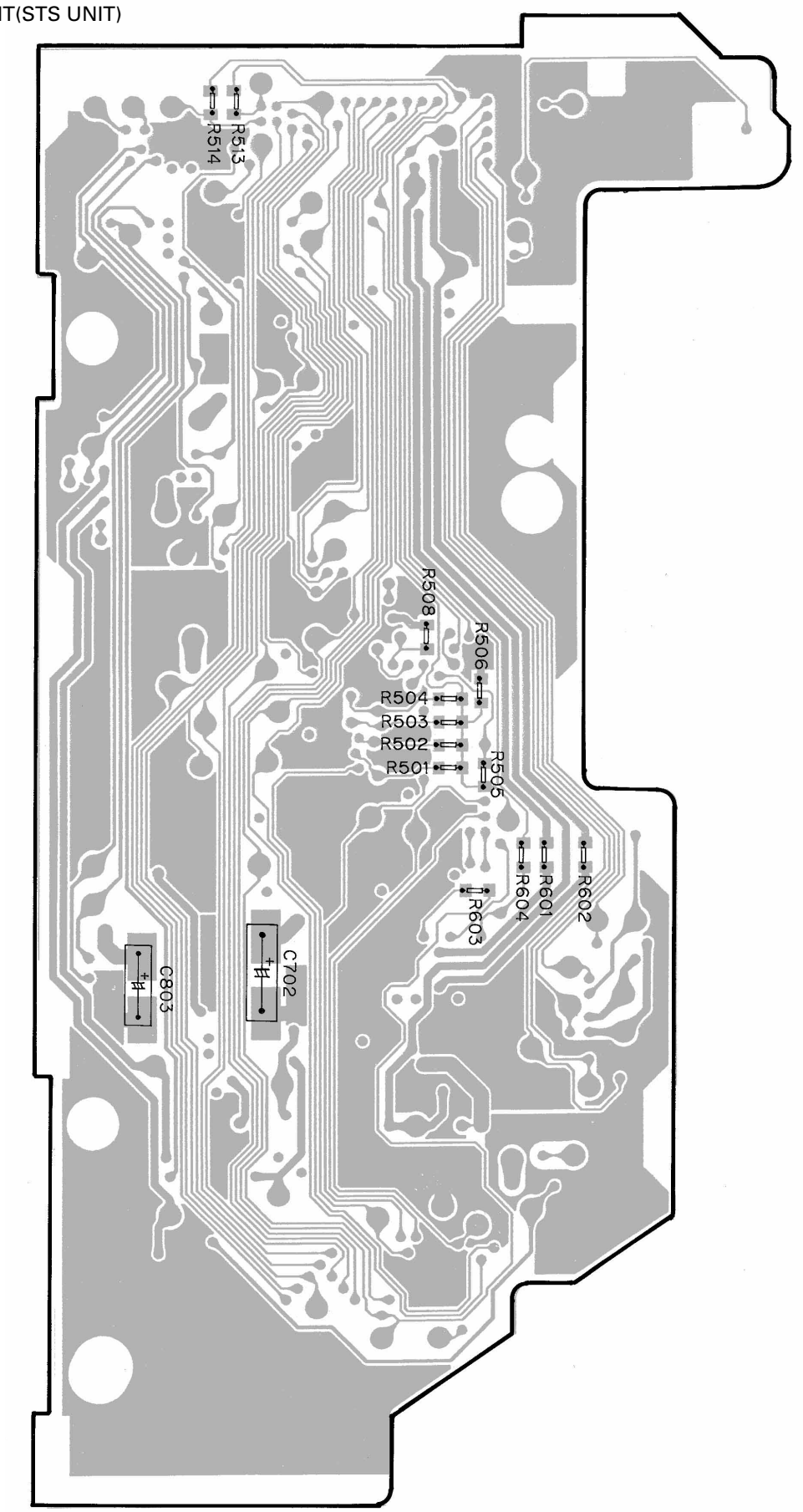
4.4 CD CORE UNIT(STS UNIT)

D CD CORE UNIT(STS UNIT)



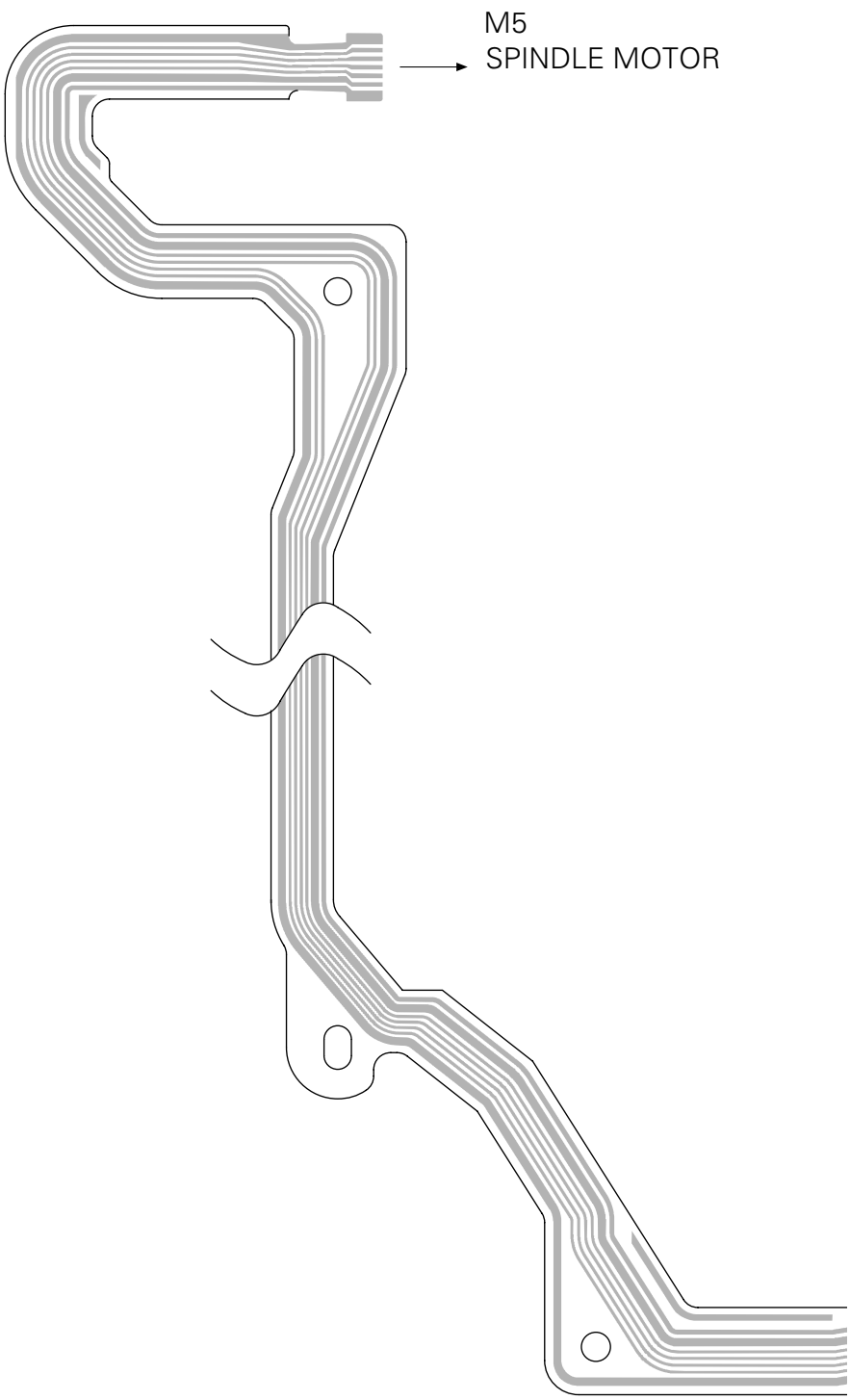
D CD CORE UNIT(STS UNIT)

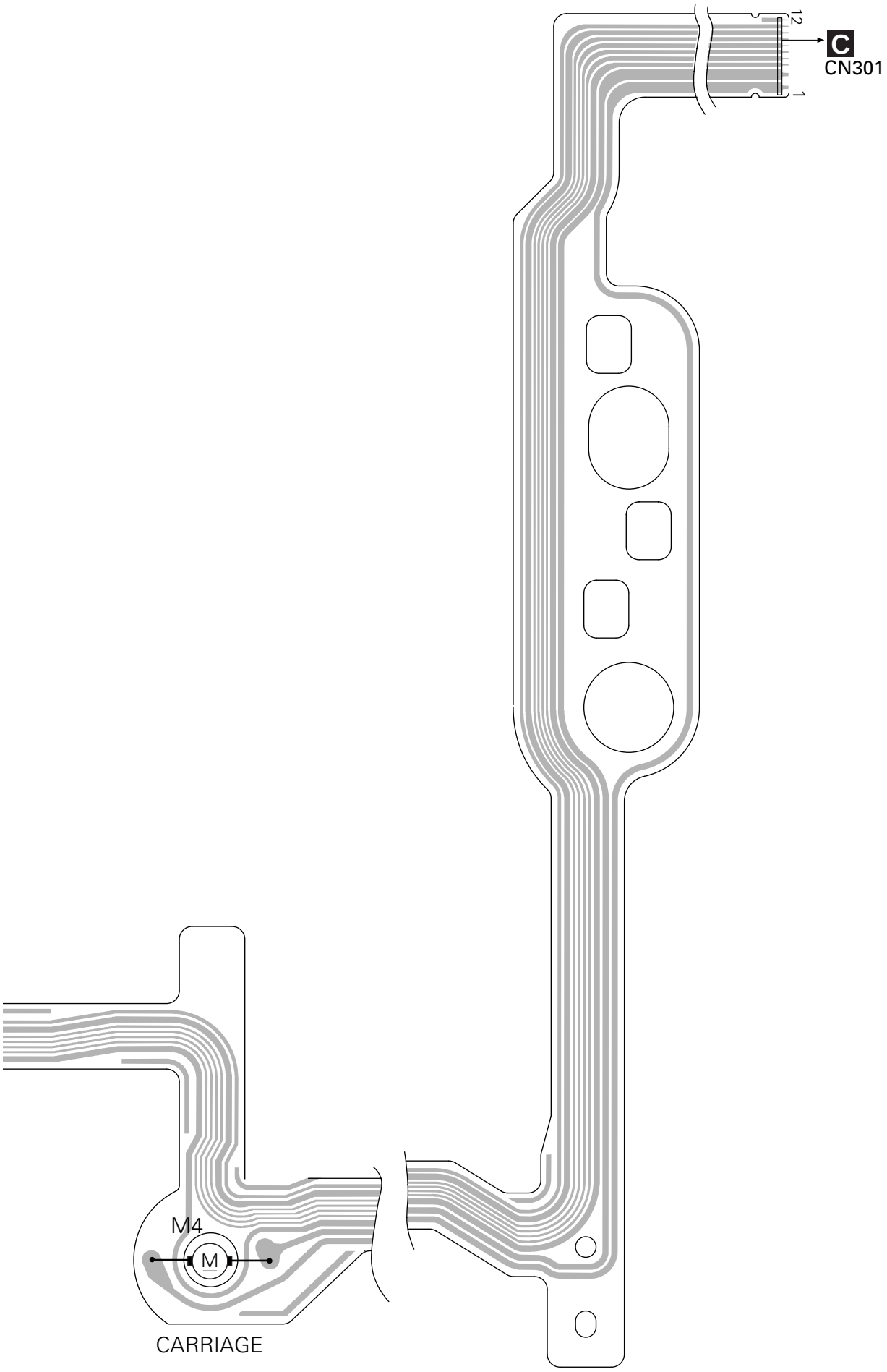
SIDE B



4.5 MOTOR PCB(B)

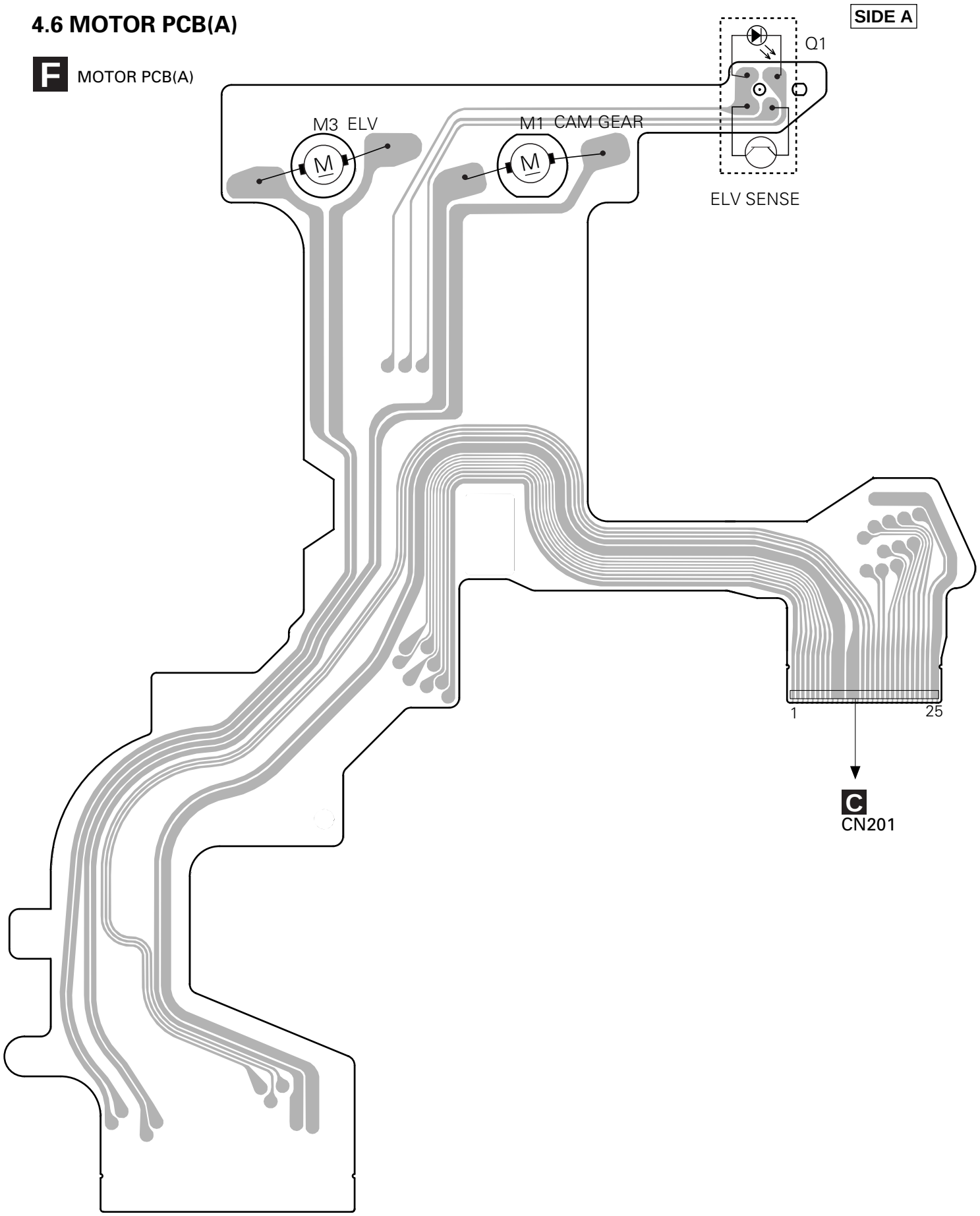
E MOTOR PCB(B)




12
1
C
CN301
M4
M
CARRIAGE

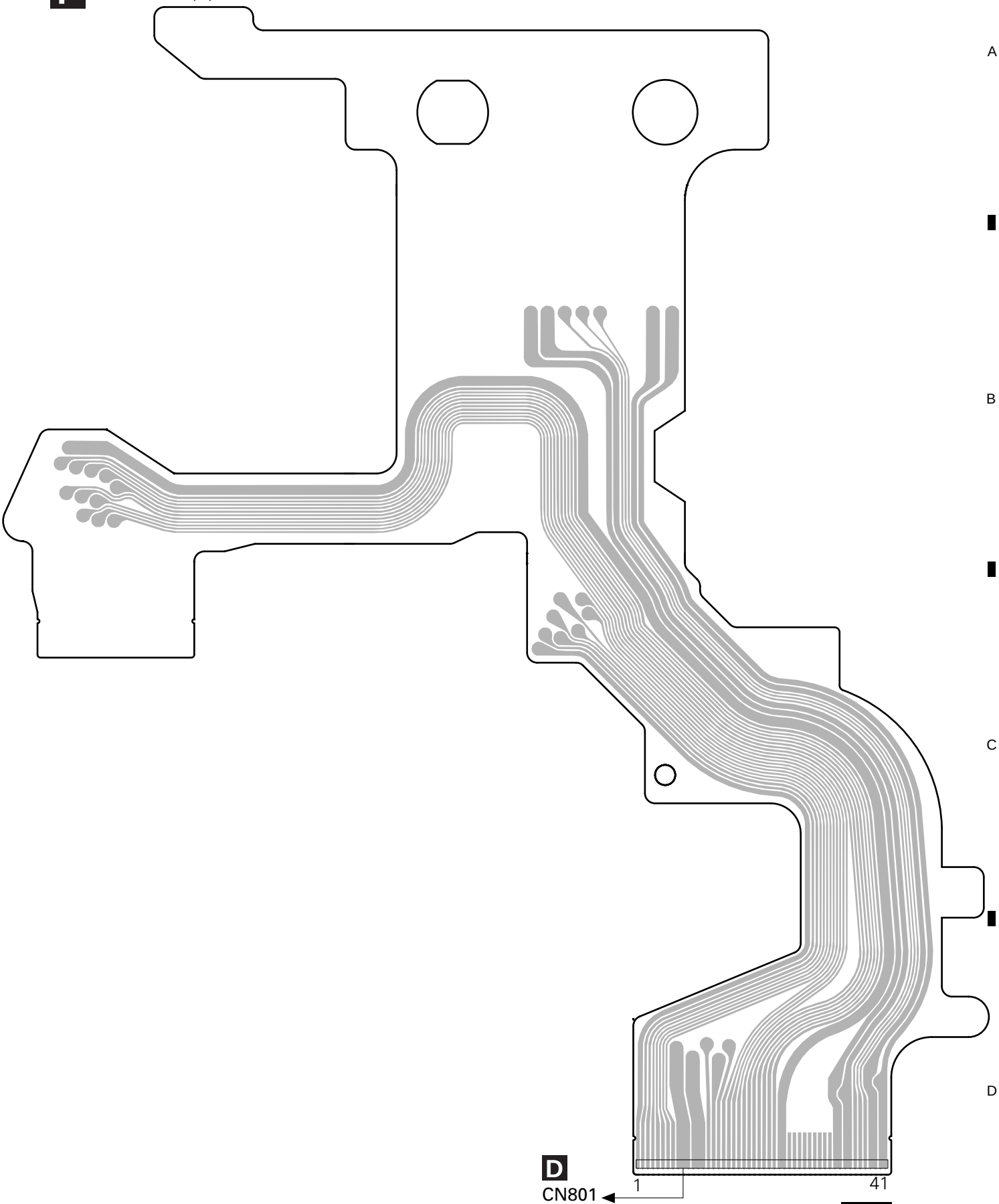
4.6 MOTOR PCB(A)

F MOTOR PCB(A)

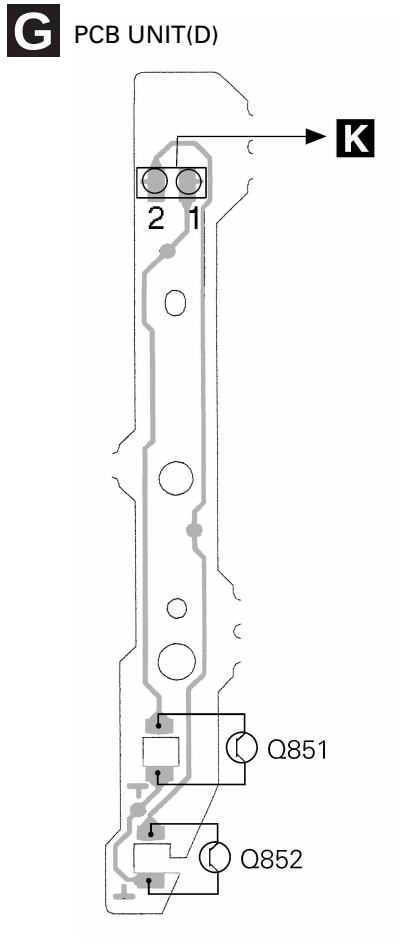


SIDE B

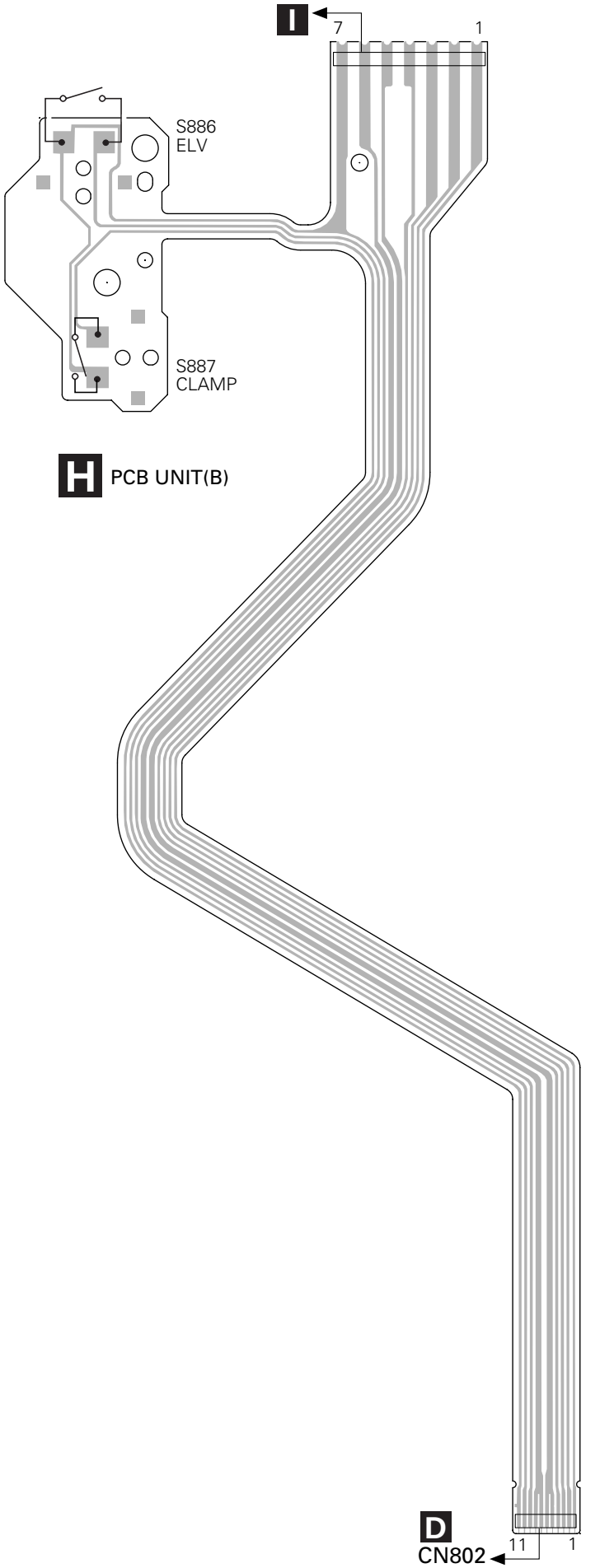
F MOTOR PCB(A)



4.7 PCB UNIT(D)



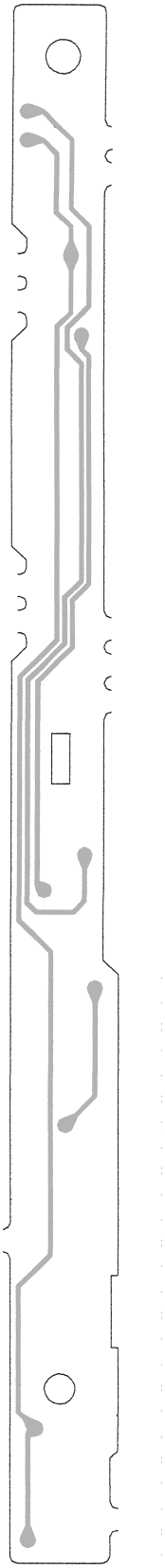
4.8 PCB UNIT(B)



4.9 PCB UNIT(E)

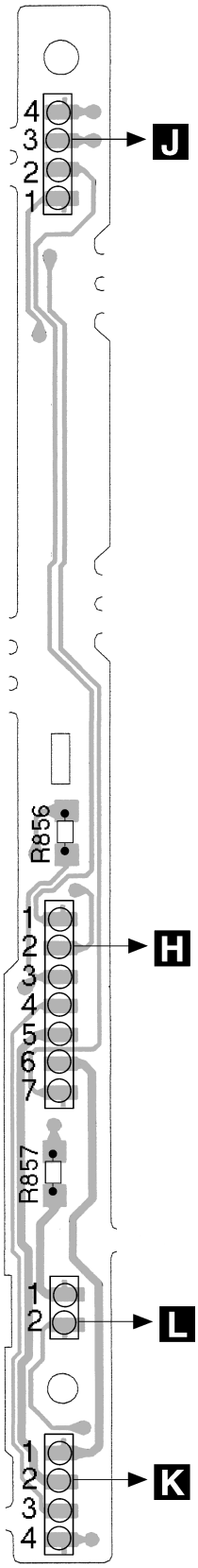
PCB UNIT(E)

SIDE A



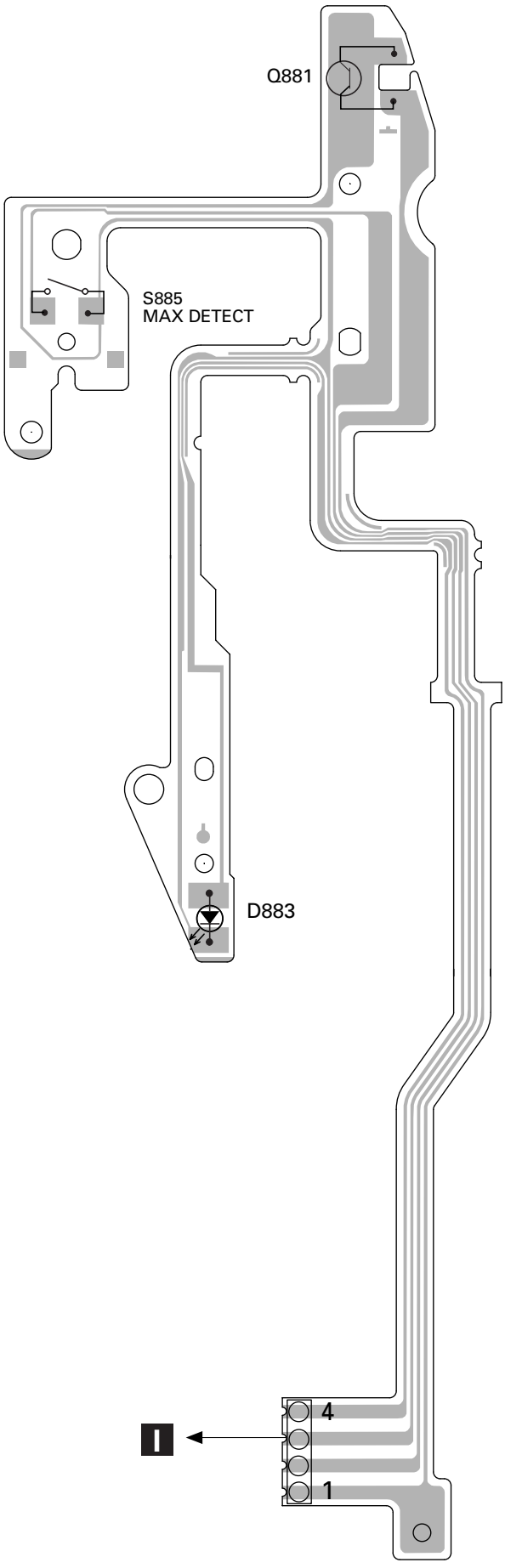
PCB UNIT(E)

SIDE B

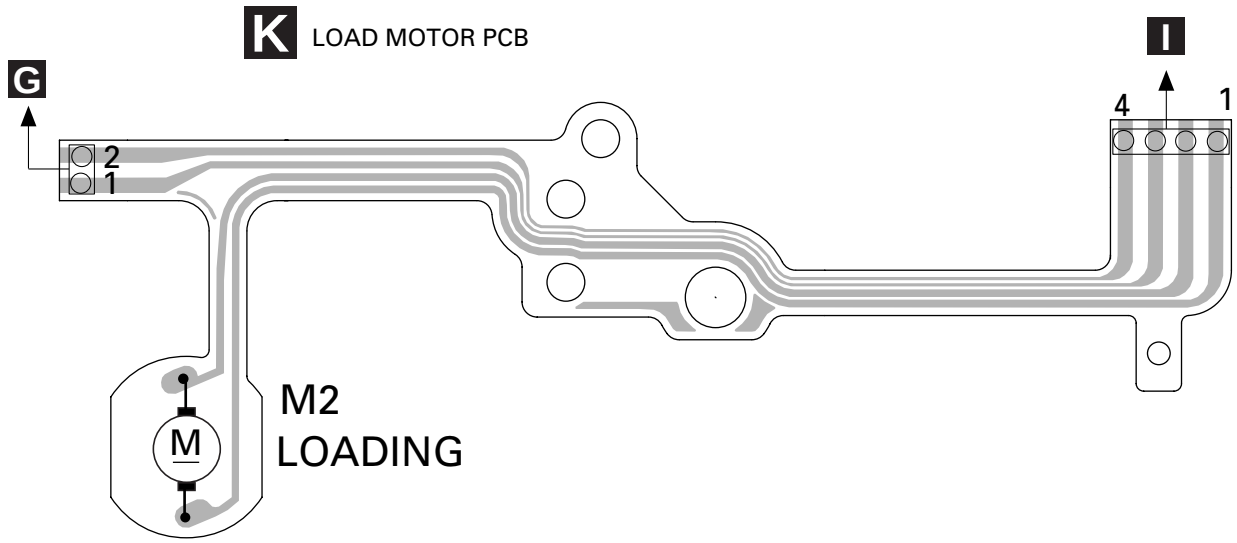


4.10 PCB UNIT(C)

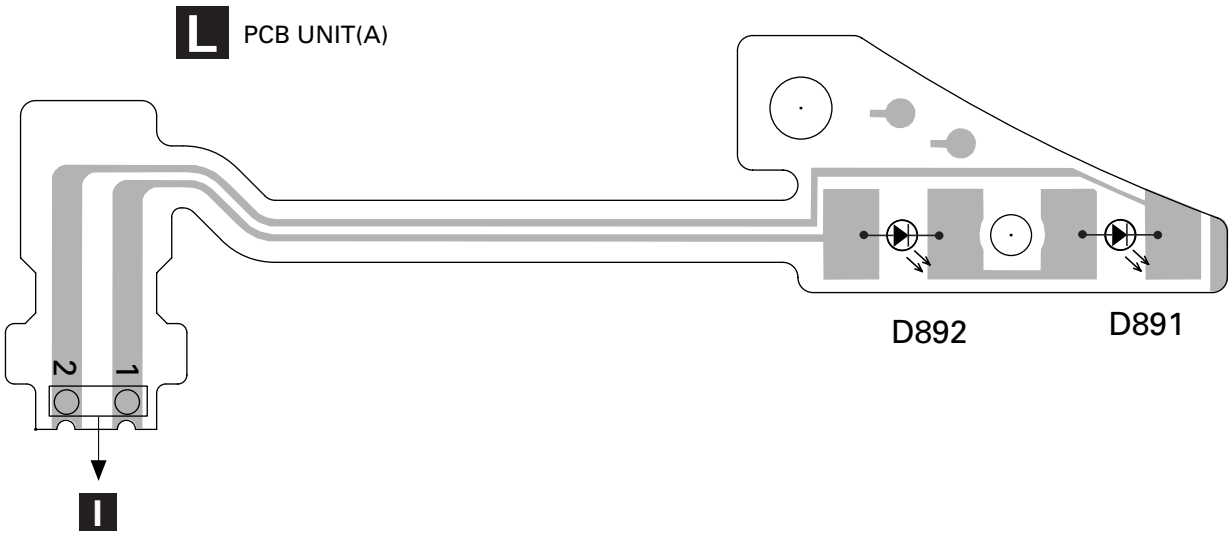
J PCB UNIT(C)



4.11 LOAD MOTOR PCB



4.12 PCB UNIT(A)



5. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A Unit Number : CWM6288
Unit Name : Extension Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	101	IC	NJM4558MD
IC	601	IC	PD5470A
IC	701	IC	M62007FP
Q	101	Transistor	DTC343TK
Q	102	Transistor	DTC343TK
Q	103	Transistor	2SA1586
Q	105	Transistor	DTC343TK
Q	106	Transistor	DTC343TK
Q	501	Transistor	DTA144EU
Q	502	Transistor	DTC144EU
Q	503	Transistor	DTC124EU
Q	601	Transistor	DTA124EU
Q	701	Chip Transistor	2SC2712
Q	702	Chip Transistor	2SC2712
Q	703	Transistor	2SD2318F5
Q	704	Transistor	2SD1007
Q	705	Transistor	2SD2318F5
Q	706	Transistor	2SA1163
Q	707	Transistor	2SC2713
Q	708	Transistor	2SB1335A
Q	709	Transistor	DTA124EU
Q	710	Transistor	DTC124EU
Q	711	Transistor	FMW1
Q	712	Transistor	2SK1485
Q	713	Chip Transistor	2SC2712
Q	714	Transistor	2SC2713
Q	715	Transistor	2SA1163
Q	720	Chip Transistor	2SC2712
Q	723	Transistor	DTC124EU
Q	724	Chip Transistor	2SC2712
Q	725	Transistor	DTC124EU
Q	726	Transistor	2SK1485
D	101	Diode	MA142WA
D	501	Diode	1SS355
D	601	Diode	MA142WK
D	701	Diode	ERC05-10B
D	702	Diode	1SR154-400
D	703	Diode	UDZS7R5(B)
D	704	Diode	1SS355
D	705	Diode	UDZS5R6(B)
D	706	Diode	HZU8R2(B3)
D	707	Diode	UDZS6R2(B)
D	708	Diode	UDZS8R2(B)
D	709	Diode	1SS355
D	710	Diode	1SS355
D	711	Diode	1SS355
L	701	Coil	CTH1190
L	702	Inductor	LCTB100K2125
TH	601	Thermistor	CCX1032
X	601	Radiator 6.290MHz	CSS1451

RESISTORS

=====Circuit Symbol and No.		===Part Name	Part No.
R	101		RS1/16S822J
R	102		RS1/16S822J
R	103		RS1/16S682J
R	104		RS1/16S682J
R	105		RS1/16S560J
R	106		RS1/16S560J
R	107		RS1/16S470J
R	108		RS1/16S470J
R	109		RS1/16S473J
R	110		RS1/16S473J
R	111		RS1/16S220J
R	112		RS1/16S220J
R	120		RS1/16S223J
R	121		RS1/16S153J
R	501		RS1/4S221J
R	502		RS1/4S223J
R	503		RS1/16S223J
R	504		RS1/16S102J
R	601		RS1/16S473J
R	602		RS1/16S473J
R	603		RS1/16S473J
R	604		RS1/16S102J
R	605		RS1/16S222J
R	606		RS1/16S222J
R	607		RS1/16S222J
R	608		RS1/16S222J
R	609		RS1/16S222J
R	610		RS1/16S222J
R	611		RS1/16S561J
R	612		RS1/16S561J
R	613		RS1/16S561J
R	614		RS1/16S561J
R	615		RS1/16S103J
R	616		RS1/16S103J
R	617		RS1/16S163J
R	618		RS1/16S222J
R	619		RS1/16S0R0J
R	620		RS1/16S473J
R	621		RS1/16S433J
R	622		RS1/16S103J
R	640		RS1/16S471J
R	641		RS1/16S471J
R	642		RS1/16S471J
R	643		RS1/16S471J
R	644		RS1/16S471J
R	649		RS1/16S222J
R	651		RS1/16S222J
R	652		RS1/16S471J
R	653		RS1/16S471J
R	654		RS1/16S471J
R	655		RS1/16S471J
R	656		RS1/16S471J
R	657		RS1/16S471J
R	658		RS1/16S471J
R	659		RS1/16S471J

=====Circuit Symbol and No.		===Part Name	Part No.
R	660		RS1/16S471J
R	661		RS1/16S102J
R	662		RS1/16S102J
R	663		RS1/16S102J
R	664		RS1/16S102J
R	665		RS1/16S102J
R	666		RS1/16S471J
R	667		RS1/16S471J
R	668		RS1/16S331J
R	669		RS1/16S331J
R	670		RS1/16S331J
R	671		RS1/16S331J
R	672		RS1/16S331J
R	673		RS1/16S471J
R	674		RS1/16S471J
R	675		RS1/16S471J
R	676		RS1/16S471J
R	677		RS1/16S222J
R	678		RS1/16S222J
R	679		RS1/16S222J
R	680		RS1/16S154J
R	681		RS1/16S222J
R	682		RS1/16S102J
R	683		RS1/16S912J
R	684		RS1/16S473J
R	685		RS1/16S102J
R	686		RS1/16S102J
R	689		RS1/16S273J
R	690		RS1/16S273J
R	691		RS1/16S273J
R	692		RS1/16S202J
R	693		RS1/16S512J
R	694		RS1/16S104J
R	695		RS1/16S104J
R	696		RS1/16S104J
R	697		RS1/16S222J
R	698		RS1/16S222J
R	699		RS1/16S222J
R	701		RS1/16S104J
R	702		RS1/16S473J
R	703		RS1/8S222J
R	704		RS1/16S473J
R	705		RS1/16S473J
R	706		RS1/16S473J
R	707		RS1/4S103J
R	708		RS1/16S223J
R	709		RS1/16S223J
R	710		RS1/16S101J
R	711		RS1/10S153J
R	712		RS1/8S103J
R	713		RS1/16S102J
R	714		RS1/16S103J
R	715		RS1/16S223J
R	716		RS1/16S103J
R	717		RS1/16S473J
R	718		RS1/16S472J
R	719		RS1/16S222J
R	720		RS1/10S681J
R	721		RS1/16S223J
R	722		RS1/16S362J
R	723		RS1/16S223J
R	724		RS1/16S223J
R	726		RS1/16S223J
R	727		RS1/4S2R2J
R	728		RS1/4S2R2J

=====Circuit Symbol and No.		===Part Name	Part No.
R	730		RS1/10S223J
R	731		RS1/16S101J
R	732		RS1/4S221J
R	733		RS1/16S511J
R	734		RS1/16S681J
R	735		RS1/16S561J
R	736		RS1/16S103J
R	737		RS1/16S273J
R	738		RS1/16S473J
R	740		RS1/16S103J
R	742		RS1/16S472J
R	743		RS1/16S362J
R	744		RS1/16S102J
R	745		RS1/16S223J
R	746		RS1/16S102J
R	747		RS1/16S103J

CAPACITORS

C	101		CEV100M16
C	102		CEV100M16
C	103		CCSRCH331J50
C	104		CCSRCH331J50
C	105		CEV100M16
C	106		CEV100M16
C	110		CEV4R7M35
C	112		CKSRYB473K16
C	113		CKSRYB472K50
C	114		CKSRYB472K50
C	501		CKSQYB391K50
C	601		CKSRYB104K16
C	603		CKSRYB103K50
C	605		CKSRYB103K50
C	651		CKSRYB103K50
C	701		CEAT471M16
C	703		CEAT471M16
C	704		CKSQYB224K16
C	705		CEV220M6R3
C	706		CKSRYB103K50
C	707		CKSRYB473K16
C	708		CEV4R7M35
C	709		CKSRYB473K16
C	710		CKSRYB473K16
C	711		CKSRYB103K50
C	712		CEV220M16
C	713		CKSRYB473K16
C	714		CEV220M6R3
C	715		CKSRYB473K16
C	716		CKSQYB103K50
C	717		CKSRYB103K50
C	720		CKSQYB334K16
C	721		CKSRYB222K50
C	722		CKSRYB473K16
C	723		CKSRYB473K16
C	724		CKSQYB104K25

B Unit Number : CWM6289
Unit Name : Keyboard Unit

MISCELLANEOUS

IC	901	IC	BU2092FV
Q	903	Transistor	2SA1586
Q	904	Transistor	DTC123JU
Q	905	Chip Transistor	2SC2712
D	901	Diode	1SS355
D	902	Diode	1SS355
D	903	Diode	1SS355
D	905	LED	CL200PGCTU
D	906	LED	CL150DCD(AB)
D	907	LED	CL200PGCTU

=====Circuit Symbol and No.		===Part Name	Part No.
D	908	LED	CL150DCD(AB)
D	909	LED	CL200PGCTU
D	910	LED	CL150DCD(AB)
D	911	LED	CL200PGCTU
D	912	LED	CL150DCD(AB)
D	913	LED	CL200PGCTU
D	914	LED	CL150DCD(AB)
D	915	LED	CL200PGCTU
D	916	LED	CL150DCD(AB)
D	917	Diode	UDZ2R7(B)
D	918	Diode	UDZ2R7(B)
S	901	Switch	CSG1043
S	902	Switch	CSG1043
S	903	Switch	CSG1043
S	904	Switch	CSG1043
S	905	Switch	CSG1043
S	906	Switch	CSG1043
S	907	Switch	CSG1043
S	910	Spring Switch	CSN1033
IL	901	Lamp 60mA, 8V	CEL1526
IL	902	Lamp 60mA, 8V	CEL1526
IL	903	Lamp 60mA, 8V	CEL1568
IL	904	Lamp 60mA, 8V	CEL1568

RESISTORS

R	901		RS1/10S561J
R	902		RS1/10S561J
R	903		RS1/10S561J
R	904		RS1/10S561J
R	910		RS1/8S511J
R	911		RS1/8S511J
R	912		RS1/8S511J
R	913		RS1/8S511J
R	914		RS1/8S511J
R	915		RS1/8S511J
R	916		RS1/8S511J
R	917		RS1/8S511J
R	918		RS1/8S511J
R	919		RS1/8S511J
R	920		RS1/8S511J
R	921		RS1/8S511J
R	931		RS1/8S510J
R	932		RS1/8S510J
R	934		RS1/10S223J
R	935		RS1/10S102J
R	936		RS1/10S103J
R	937		RS1/10S362J
R	938		RS1/10S472J

CAPACITORS

C	901		CKSQYB104K50

C Unit Number : CWX2202
Unit Name : CD Core Unit(Servo Unit)

MISCELLANEOUS

IC	101	IC	UPC2572GS
IC	201	IC	UPD63702AGF
IC	301	IC	BA5986FM
Q	101	Transistor	2SD1664
Q	102	Transistor	UMD2N
D	301	Diode	1SR154-400
X	201	Ceramic Resonator 16.934MHz	CSS1457
EF	201	Filter	CCG1076

RESISTORS

R	101		RS1/8S100J
R	102		RS1/8S120J
R	104		RS1/16S822J
R	105		RS1/16S682J
R	106		RS1/16S183J
R	107		RS1/16S822J
R	108		RS1/16S333J
R	109		RS1/16S683J
R	110		RS1/16S134J
R	111		RS1/16S273J
R	112		RS1/16S222J
R	113		RS1/16S103J
R	114		RS1/16S103J
R	115		RS1/16S102J
R	116		RS1/16S163J
R	117		RS1/16S163J
R	120		RS1/16S101J
R	121		RS1/16S101J
R	125		RS1/16S0R0J
R	201		RS1/16S104J
R	202		RS1/16S103J
R	203		RS1/16S332J
R	204		RS1/16S752J
R	205		RS1/16S752J
R	206		RS1/16S101J
R	250		RS1/16S331J
R	251		RS1/16S331J
R	252		RS1/16S331J
R	253		RS1/16S331J
R	254		RS1/16S331J
R	255		RS1/16S471J
R	256		RS1/16S471J
R	259		RS1/16S221J
R	263		RS1/16S471J
R	269		RS1/16S0R0J
R	274		RS1/16S471J
R	277		RS1/16S471J
R	301		RS1/16S103J
R	302		RS1/16S153J
R	303		RS1/16S103J
R	304		RS1/16S273J
R	305		RS1/16S103J
R	306		RS1/16S752J
R	307		RS1/16S103J
R	308		RS1/16S103J
R	309		RS1/16S471J
R	311		RS1/16S471J

CAPACITORS

C	101		CEV101M6R3
C	102		CKSQYB104K16
C	103		CEV470M6R3
C	104		CKSQYB334K16
C	105		CCSRCH240J50
C	106		CKSRYB222K50
C	107		CEV4R7M35
C	108		CKSRYB273K25
C	109		CCSRCH101J50
C	110		CKSQYB104K16
C	111		CKSRYB332K50
C	112		CKSQYB473K16
C	113		CKSRYB103K25
C	114		CKSRYB391K50
C	115		CCSRCH121J50
C	116		CKSRYB682K50
C	117		CKSRYB333K16
C	118		CKSQYB334K16
C	119		CKSQYB334K16
C	120		CKSQYB334K16
C	121		CKSQYB334K16
C	122		CKSQYB104K16
C	123		CKSRYB472K50
C	124		CKSQYB104K16
C	125		CCSRCH5R0C50

=====Circuit Symbol and No.		===Part Name	Part No.
C	126		CKSRYB153K25
C	127		CKSRYB102K50
C	201		CKSQYB334K16
C	202		CKSQYB104K16
C	203		CKSQYB104K16
C	204		CKSRYB471K50
C	207		CKSQYB683K16
C	208		CKSRYB821K50
C	209		CKSRYB273K25
C	210		CKSQYB334K16
C	211		CKSQYB334K16
C	212		CKSQYB334K16
C	213	22µF/6.3V	CCH1300
C	301		CEV101M10
C	302		CEV101M10

D Unit Number : CWX2203
Unit Name : CD Core Unit(STS Unit)

MISCELLANEOUS

IC	501	IC	CXD2511R
IC	502	IC	MSM514400DP-60TS
IC	601	IC	AK4321VF
IC	701	IC	BA05SFP
IC	801	IC	LB1836M
IC	802	IC	LB1836M
Q	801	Transistor	DTA123JK
Q	802	Transistor	UN2211
D	701	Diode	1SR154-400
D	702	Diode	1SR154-400
D	703	Diode	1SS355
D	704	Diode	1SS355
D	705	Diode	1SS355
D	706	Diode	1SS355
D	707	Diode	1SS355
D	708	Diode	1SS355
S	801	Spring Switch(LOAD)	CSN1052
S	802	Spring Switch(DOOR)	CSN1052
S	803	Spring Switch(MODE)	CSN1052
EF	701	Filter	CCG1051
EF	702	Filter	CCG1051

RESISTORS

R	501		RS1/16S102J
R	502		RS1/16S202J
R	503		RS1/16S392J
R	504		RS1/16S822J
R	505		RS1/16S163J
R	506		RS1/16S512J
R	507		RS1/16S182J
R	508		RS1/16S222J
R	509		RS1/16S102J
R	510		RS1/16S102J
R	511		RS1/16S102J
R	512		RS1/16S102J
R	513		RS1/16S102J
R	514		RS1/16S471J
R	601		RS1/16S101J
R	602		RS1/16S101J
R	603		RS1/16S471J
R	604		RS1/16S471J
R	701		RS1/10S0R0J
R	702		RS1/10S100J
R	716		RS1/16S471J
R	717		RS1/16S471J
R	718		RS1/16S471J
R	801		RS1/10S102J

=====Circuit Symbol and No.		===Part Name	Part No.

CAPACITORS

C	501		CKSQYB334K16
C	502		CKSQYB334K16
C	503		CKSQYB334K16
C	504		CCSRCH471J50
C	506		CCSRCH221J50
C	601		CKSQYB334K16
C	602		CCSRCH221J50
C	603		CKSQYB334K16
C	604		CKSQYB334K16
C	605	22µF/6.3V	CCH1300
C	606		CKSQYB334K16
C	701	22µF/6.3V	CCH1300
C	702		CEVL101M6R3
C	703		CKSQYB334K16
C	704		CKSQYB334K16
C	801		CKSQYB104K25
C	802		CKSQYB104K25
C	803		CEVL220M16

G Unit Number :
Unit Name : PCB Unit(D)

Q	851	Photo-transistor	CPT230SCTD(CD)
Q	852	Photo-transistor	CPT230SCTD(CD)

I Unit Number :
Unit Name : PCB Unit(E)

R	856		RS1/8S911J
R	857		RS1/8S821J

J Unit Number :
Unit Name : PCB Unit(C)

Q	881	Photo-transistor	CPT230SCTD(CD)
D	883	Chip LED	CL202IRXTU
S	885	Spring Switch(MAX)	CSN1052

L Unit Number :
Unit Name : PCB Unit(A)

D	891	Chip LED	CL202IRXTU
D	892	Chip LED	CL202IRXTU

H Unit Number :
Unit Name : PCB Unit(B)

S	886	Spring Switch(ELV Home)	CSN1052
S	887	Spring Switch(Clamp)	CSN1051

F Unit Number :
Unit Name : Motor PCB(A)

Q	1	Photo-interrupter	RPI-221
M	1	Motor Unit(Cam Gear)	CXB3174
M	3	Motor Unit(ELV)	CXB3175

E Unit Number :
Unit Name : Motor PCB(B)

M	4	Motor Unit(Carriage)	CXB3178
M	5	Motor(Spindle)	CXM1120

K Unit Number :
Unit Name : Load Motor PCB

M	2	Motor Unit(Load)	CXB3177

Miscellaneous Parts List

		Pickup Unit(Service)(P8)	CXX1311

6. ADJUSTMENT

CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

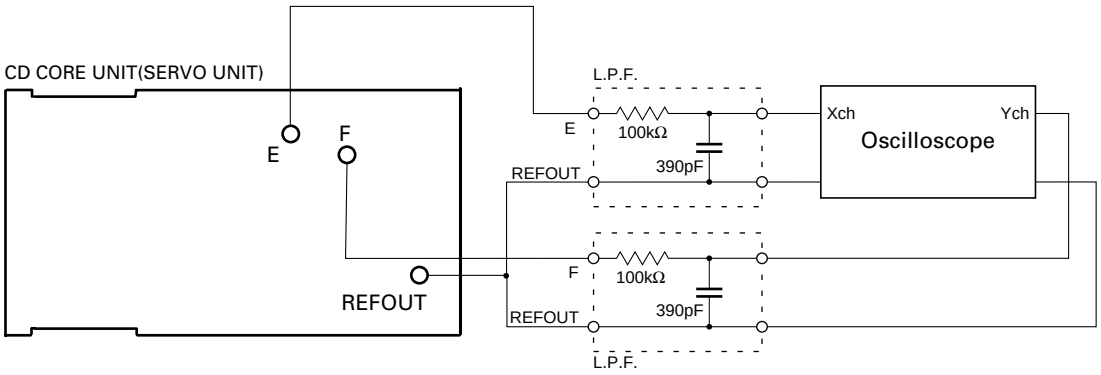
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, REFOUT
• Disc	• ABEX TCD-784
• Mode	• TEST MODE



• **Checking Procedure**

1. In test mode, load the disc and switch the 5V regulator on.
2. Using the TRK+ and TRK- buttons, move the PU unit to the innermost track.
3. Press key **F9** to close focus, the display should read "91". Press key **F8** to implement the tracking balance adjustment the display should now read "81". Press key **F9** 4 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

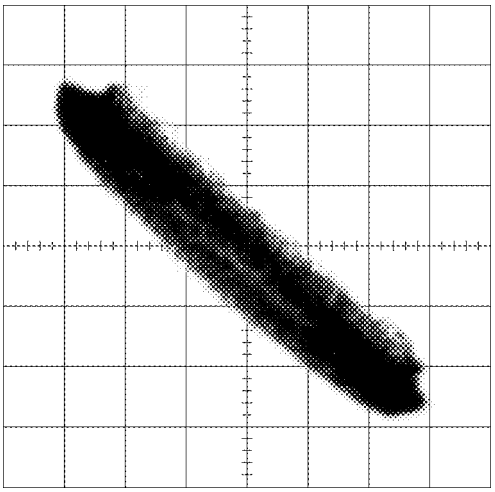
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

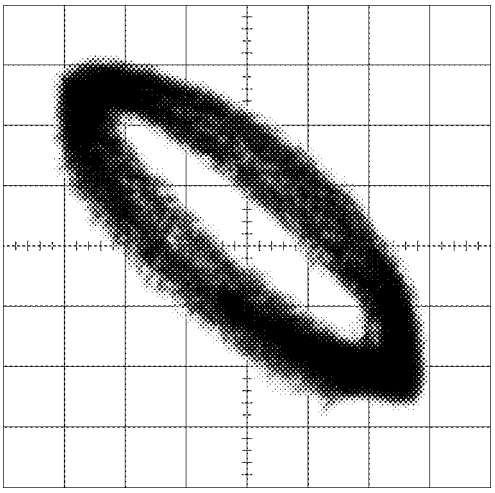
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

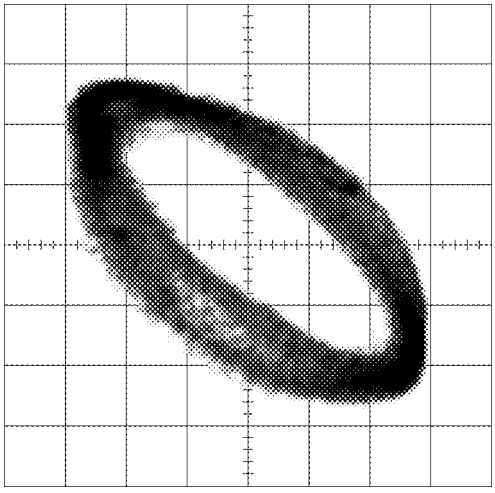
0°



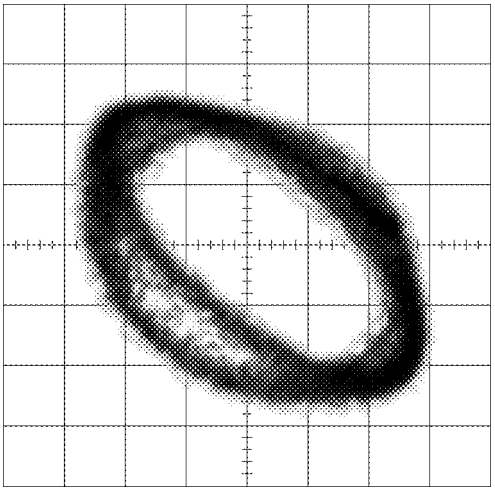
30°



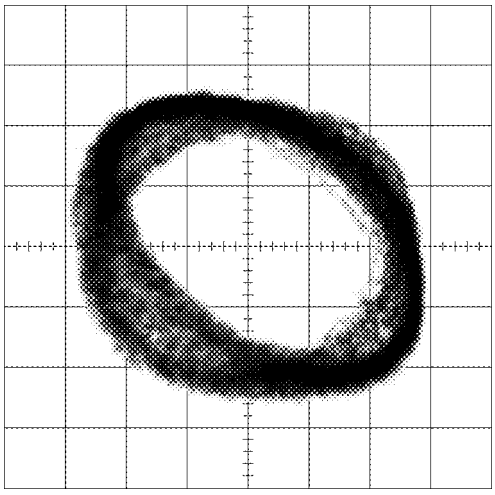
45°



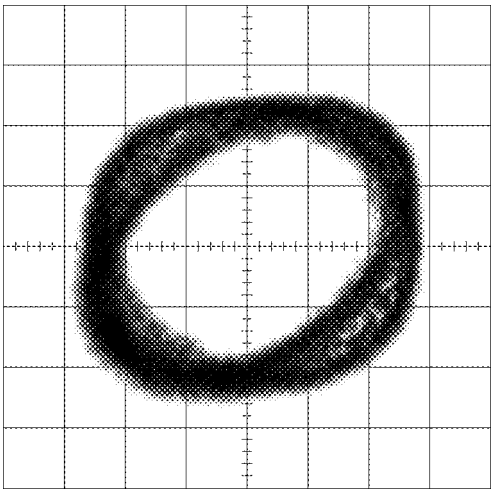
60°



75°



90°



7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 TEST MODE

● CD Test Mode

1) Precautions on Adjustment

- The unit employs a single voltage (+5V) for the regulator, thus the reference potential of the signal is RFOUT (approximately 2.5V) rather than GND.
  Inadvertent contact of REFOUT and GND during adjustment can result not only in disabling normal potential measurement but also in exposing the pick-up to strong impacts due to malfunctioning of the servo. Therefore, you are requested to observe the following precautions.
- Make sure that the negative probe of the measuring instrument is not connected to RFOUT or GND. Special care must be exercised so that the channel 1 negative probe may not be connected to the oscilloscope and the channel 2 negative probe to GND. Since the frame of the measuring instrument is usually at the same potential as the negative probe, the frame of the measuring instrument must be changed to floating status.
  When RFOUT is inadvertently connected to GND, you must immediately turn off the regulator or power supply.
- The regulator must be turned off before mounting or dismounting filters or wiring materials.
- You should not start adjustment or measurement immediately after the regulator is turned on. It is recommended to run the player for approximately one minute so that it may stabilize.
- When the test mode is turned on, various protective functions from the software become unavailable. Thus, you must make sure that undesirable electric or mechanical shocks are not be given to the system.
- This model employs a photo-transistor for detecting discs at their loading or ejection. Thus, if its outer case is removed during repair work and internal parts are exposed to light of strong intensity, malfunctions including the following can result:
  * The eject button becomes inoperable during play. Pressing the eject button does not eject a disc and play is continued.
  * Loading becomes unavailable.

  If a malfunction is recognized, appropriate remedial actions must be taken. Such actions include changing the light source position, changing the unit position and applying a cover to the photo-transistor.
- When you press the [EJECT] key to eject a disc, you must not touch any other key until the ejection is complete.
- If you press the [FF] or [REV] for the focus search in the test mode, you must turn the power off immediately. (Otherwise, the lens will be forced to stick to the top or bottom, potentially resulting in the burning of the actuator.)

2) Test Mode Controller

It has RPT and ASEL (RDM) functions which can be separately turned on.
(Even if a common key is used for both functions, it is usable as long as it can turn on the RPT when depressed for a longer duration and the ASEL for a shorter duration. The type of key that sequentially turns on the RPT, ASEL and NORMAL is not acceptable.)
For performing adjustments, this product should be connected to a CD control unit (Pioneer 14-pin H-BUS head unit). So, you can operate the product using the keys on the CD control unit connected to it.
See below on how to enter the test mode and key operations when KEH-M7056ZH-02/US is connected. The keys referred to in the adjustment explanations are those for KEH-M7056ZH-02/US. (When KEH-M7056ZH-02/US is used as a head unit, connect the 8-pin/14-pin conversion jig (GGD1163) to it.)

● **Turning the Test Mode On and Off**

① Turn the power on while depressing the [EJECT] key. Release the [EJECT] key 5 seconds after powering on. (If the [EJECT] key is being depressed when you hit the reset start key, the test mode will be automatically be turned on.)
② Turn the source (CD) on.
③ As the test mode is turned on, "55" will be displayed by the track number indicator. At this time, the disc number indicator will display the number of the disc selected.
④ Turn Backup or Acc off once, then turn it on again to cancel the test mode.

● **[Important] Display and Bus Data While the Test Mode is On**

* In order to operate the test mode from the currently marketed Head unit which is not equipped with a test mode command output function, the same bus communication as that in the normal operation mode is carried out with the Head unit. And, as long as the test mode is on, it is connected as the changer (single CD player in normal mode).
* If the servo test mode or the mechanical test mode is selected, display of the disc number will be fixed at "6". This arrangement has been employed because the Head unit on the H-BUS does not output the corresponding command when one of the [1] to [6] keys is depressed if the depressed one is identical to the displayed disc number (for instance, if "DISC 4" is displayed, pressing the [4] key does not output the corresponding command). Thus, when the test mode is started, check the currently selected disc number before turning on the servo test mode or the mechanical test mode (namely, turn the above mode on when "55" is displayed). Turning off the servo test mode or the mechanical test mode restores the display shown in ③ above.

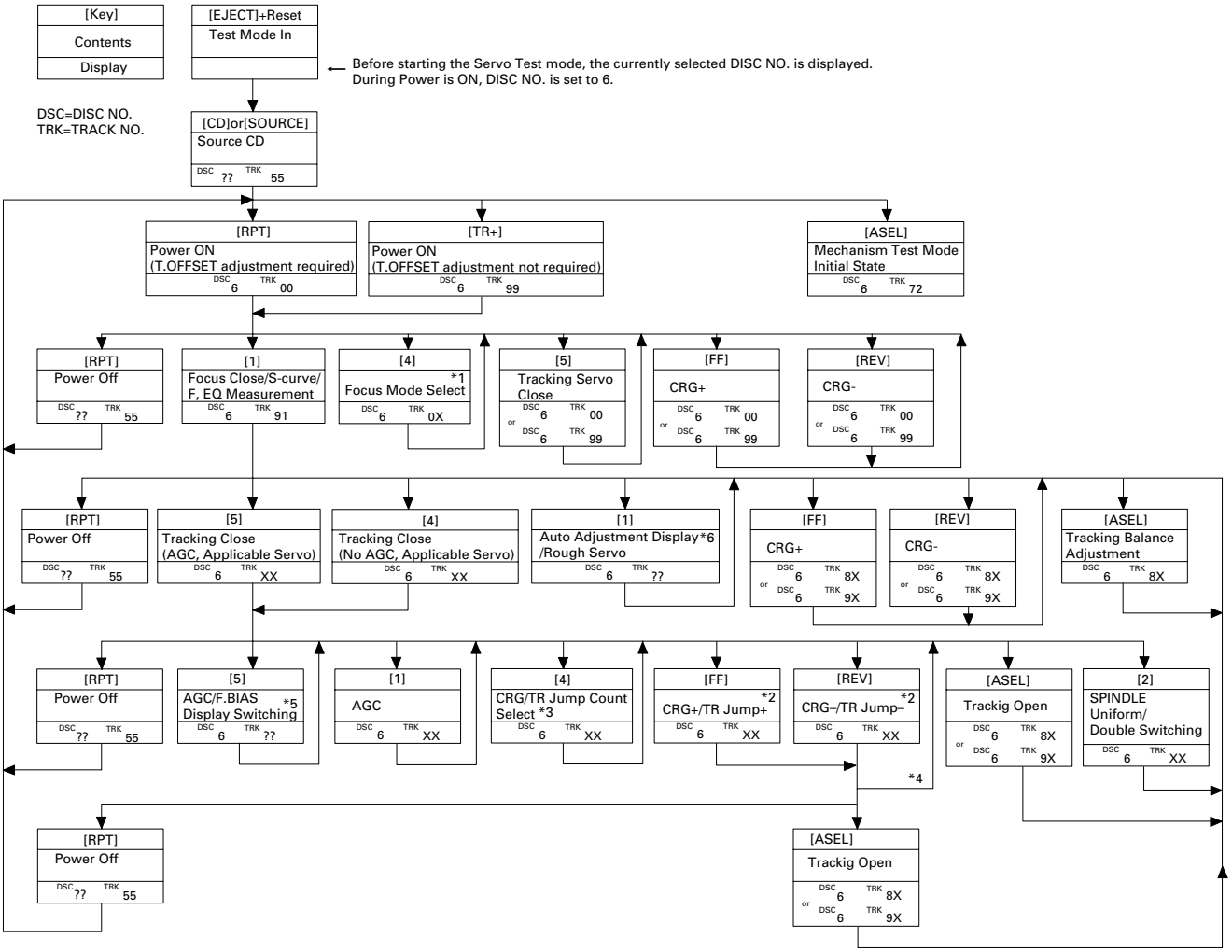
● **[Important] Precautions on Key Operations in Test Mode**

* If you press one of the [1] to [5] keys while the display is fixed at "DISC 6", the Head unit displays the depressed key number once. Thus, don't try to operate any keys until the "DISC 6" display is restored, It takes 3 to 4 seconds.
  Example: If you depress the [5] key when "D = 6 and TR = 99" are displayed, the display will sequentially change as shown below:
  "D = 5, TR = 00" -> "D = 6, TR = 00" -> "D = 6, TR = ??" (now you can proceed to the next operation).
* If you depress the [RPT] or [ASEL] key, the RPT or ASEL LED on the indicator comes on once, then it goes off in 3 to 4 seconds. Therefore, don't try to operate keys until the LED goes off.

● **[Important] Other Precautions**

* Due to a slower bus communication rate, data displayed on the track number indicator may fail to catch up with the mechanical status changes. This is especially true when the mechanism is operated in the test mode. So, when operating the system in the mechanical test mode, you should monitor the changes after removing the top plate.
* When turning on the servo or mechanical test mode with the disc inserted, be sure to insert the disc while the normal mode is on, that is, before starting the test mode.
* The common SEEK key is used for the [FF/REV] and [UP/DOWN] functions on the Head unit. Thus, when operating the [FF/REV] key, you need to hold the SEEK key down for at least 0.5 seconds. When the [FF/REV] operation is validated, beep will sound and the mechanism starts. If the SEEK key is released before the 0.5-second elapse time, it will be mistaken as the UP/DOWN operation, resulting in +1 incrementing (or-1 decrementing) of the value displayed on the track number indicated. In this case, leave as is and the original display will be restored in several seconds.

● CD Player Flowchart



*1) Switching must take place in the following sequence.

Focus Close (TRK 00 / TRK 99) → S.Curve Check TRK 01 → Focus EQ Measurement. TRK 02

*2) Single TR /4TR / 10TR / 32TR / 100TR

*3) Switching must take place in the following sequence.

Single TR 9X(8X):91(81) → 4 TR 92(82) → 10 TR 93(83) → 32 TR 94(84) → 100 TR 95(85) → CRG Move 96(86)

*4) It applies to the CRB Move and 100TR Jump alone.

*5) Switching must take place in the following sequence.

Min/Sec (or Track No.) → F.AGC Gain → F.AGC Gain → F. BIAS Setting

(AGC Gain = (Current value/Initial value) x 20)

*6) Switching must take place in the following sequence.

F.Cancel Display → T.Offset Display → T.Bal Display → Rough Servo.

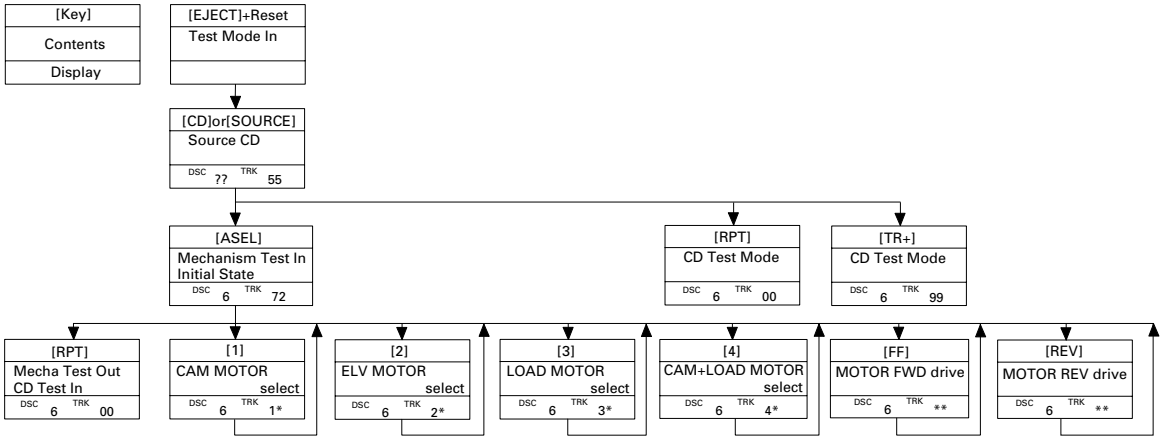
(F.Bias value, F.Cancel value, T.Offset value, T.Bal value
= (Upper 8 bits of the setting (7F[H] to 80[H] + 128)/4
= 63[D] to 32[D] to 00[D]).

[Key]	Operation
[RPT]	Power ON/OFF
[FF]	CRG+/TR Jump+ (Toward outer perimeter)
[REV]	CRG-/TR Jump- (Toward inner perimeter)
[5]	Tracking Close/AGC gain, F.Bias adjustment value display switching
[ASEL]	Auto Tracking Balance adjustment/ Tracking Open
[1]	Focus Close, S.Curve, F.EQ measurement/ Rough Servo/AGC
[2]	Focus Open
[3]	Jump Off
[4]	Focus Mode select/Tracking Close/ CRG/TR Jump Switching
[TR+]	Power ON(T.OFFSET adjustment not required)

- Operation of TR JUMPs other than 100TR is continued after your finger has left the key.
  CRG Move and 100TR Jump are forced to the Tracking Close Mode when the key is released.
- Powering on or off resets the Jump Mode to the Single TR (91).
- When ACC or Back up is off, the test mode is canceled.

Note: The H-BUS head unit must be employed for controlling the test mode.
Note: Sound is unavailable even after the tracking has been closed
(this trouble results when the IC for the STS is not controlled in the test mode).
Note: When you pressed the [FF] or [REV] key during the Focus Search, you must turn the power off immediately
(otherwise, the lens can stick resulting in actuator damages).
Important: For continued key operations, keep the interval between key operations 4 seconds or more.

● CD Changer Mechanism Flowchart

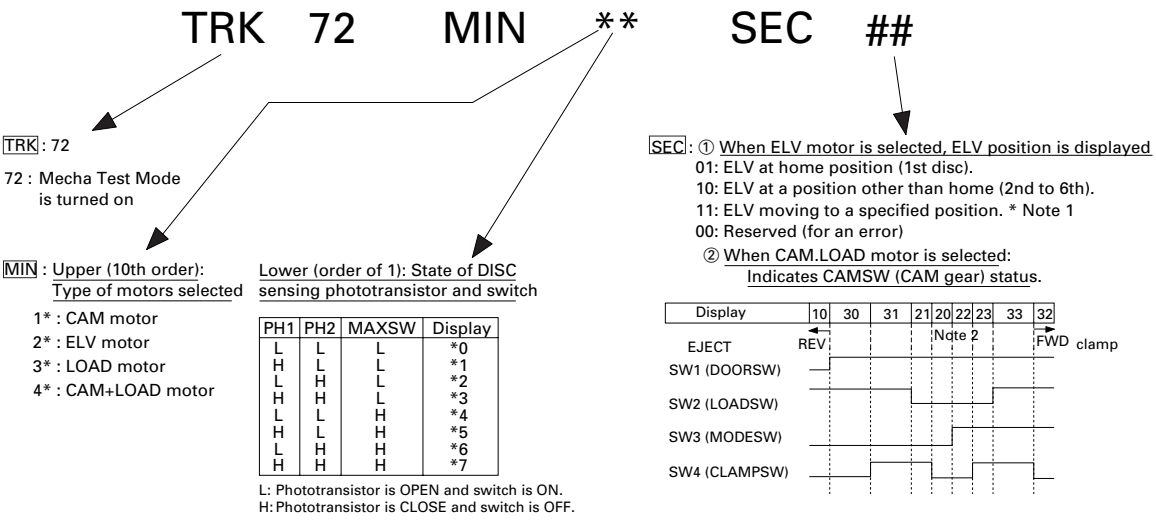


● Operating Procedures:

1) Turn on the CD Test Mode, then select the CD-MULTI for the SOURCE.
2) Select the motor to be driven using the [1] to [4] keys. (TRK ?*)
3) Press the [FF] or [REV] in this state to drive the selected motor.

[Key]	Operation
[ASEL]	Mechanism Test is initialized.
[FF]	Valid only when the motor selected (using the [1] to [4] keys) is driven in FWD direction.
[REV]	Valid only when the motor selected (using the [1] to [4] keys) is driven in REV direction.
[1]	CAM MOTOR is selected.
[2]	ELV MOTOR is selected.
[3]	LOAD MOTOR is selected.
[4]	CAM + LOAD MOTOR is selected.

<Screen Display during Mecha Test Mode>


TRK 72 MIN ** SEC ##
TRK : 72
72 : Mecha Test Mode is turned on
MIN : Upper (10th order): Type of motors selected
1* : CAM motor
2* : ELV motor
3* : LOAD motor
4* : CAM+LOAD motor
Lower (order of 1): State of DISC sensing phototransistor and switch
PH1 PH2 MAXSW Display
L L L *0
H L L *1
L H L *2
H H L *3
L L H *4
H L H *5
L H H *6
H H H *7
L: Phototransistor is OPEN and switch is ON.
H: Phototransistor is CLOSE and switch is OFF.
SEC : ① When ELV motor is selected, ELV position is displayed
01: ELV at home position (1st disc).
10: ELV at a position other than home (2nd to 6th).
11: ELV moving to a specified position. * Note 1
00: Reserved (for an error)
② When CAM.LOAD motor is selected:
Indicates CAMSW (CAM gear) status.
Display 10 30 31 21 20 22 23 33 32
EJECT REV Note 2 FWD clamp
SW1 (DOORSW)
SW2 (LOADSW)
SW3 (MODESW)
SW4 (CLAMPSW)

An example when TRK 72, MIN 10 and SEC 31:

Test Mode is turned on from TRK 72.
CAMMOTOR is selected from 1 of MIN 10 and PH1/PH2 are selected from 0. All MAX switches are set to L (low).
As for SEC 31, since CAMMOTOR is selected from MIN, CAM gear CLAMP switch is set to L (low) and others are H (high) from SEC①.

● Precautions

* The keys are inoperable as long as operation of the mechanism is continued.
* When driving the CAMMOTOR in 31 → 30 → 10 (in REV direction), the elevation position must be at the EJECT/LOAD position (the top position).

Note 1: When the elevation is situated at the Note 1 position, move of any motor other than the REV is disabled.
Note 2: Before performing the elevation, make sure that the CAM SW (switch) is set to a position between 22 and 20.
As a rule, driving of the ELV MOTOR must be started immediately after the CAMSW indication has changed from 22 to 20.

● Operating Procedures for Ejecting a Clamped Disc

① Select CAMMOTOR using [1], then press the REV direction while the disc is being clamped (CAMSW state is 32).
The CAMSW status indication sequentially changes through 32→33→23→22.
② When the disc to be ejected is not identical with the disc being clamped, select the [2] ELVMOTOR in the vicinity of where the display changes from 22 to 20, then match the elevation to the disc to be ejected according to the following procedures:
After selecting ELVMOTOR, lower the elevation until the ELV position display becomes 01 (1st disc) using the REV direction.
Drive the elevation up until the display is changed to 10. This is the elevation where the second disk is situated.
The next display of 10 tells you the elevation of the 3rd disc. Repeating this operation allows you to establish an elevation matching each disc. (When the elevation is driven from the 1st through 6th disc, the status display changes as 01→11→10→11→10→11→10→11→10→11→10.)
(When the disc to be ejected coincides with the disc being clamped, the above operations are not necessary.)
③ Select the [1] CAMMOTOR and then, using the REV direction, drive it until the display changes from 20 (or 22) to 21 and 31.
④ Select the [2] ELVMOTOR, then drive the tray of the disc to be ejected up to the EJECT/LOAD position (using the FWD direction).
⑤ Select the [4] CAM+LOADMOTOR, then drive it in the REV direction until the display changes from 31 to 30 and 10.
The door will open immediately before the display changes to 10 and part of the disc will be pushed out.
⑥ When 10 is displayed, select the [3] LOADMOTOR, then drive it in REV direction until the disc is completely ejected.

7.1.2 DISASSEMBLY

● Removing the upper case (not shown)

1. Remove the five screws, then remove the upper case.

● Removing the Extension Unit (Fig. 1)

1. Remove the three screws B, then remove the side frame and holder.
2. Remove screw C, screw D and PCB from the connector.
3. Straighten the three currently bent claws, then remove the extension unit.

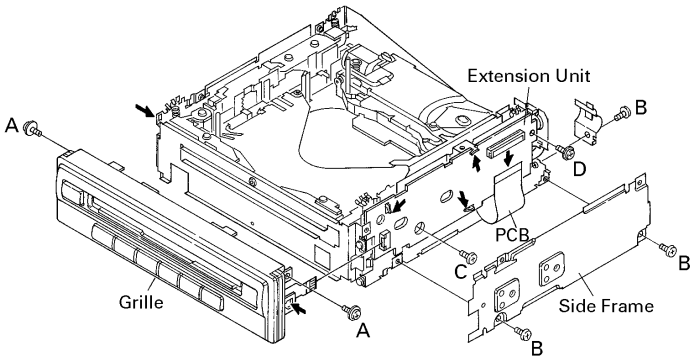


Fig. 1

● Removing the Grille Assy (Fig. 1)

1. Remove the two screws A and the connector, then remove the grille assy.

● Removing the CD Mechanism Module (Fig. 2)

1. Remove the three screws A, then remove the front frame.
2. Remove the three screws B and two screws C, then remove the damper and holder.
3. Remove the two spring Ⓐs, spring Ⓑ and spring Ⓒ from the hook, then remove the CD mechanism module.

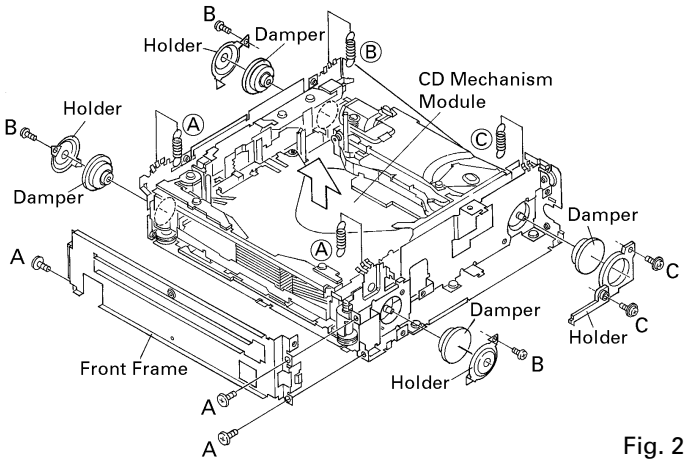


Fig. 2

– Precautions on Assembly –

Apply spring Ⓒ (black) to the front side hook.

Remaining springs Ⓐ and Ⓑ are to be hung on the center hook.

● Removing the Keyboard PCB (Fig. 3)

1. Remove screws A and B, then remove the switch PCB.
2. Remove the four screws C, then remove the guide.
3. Remove the four screws B and screw A, then remove the keyboard PCB.

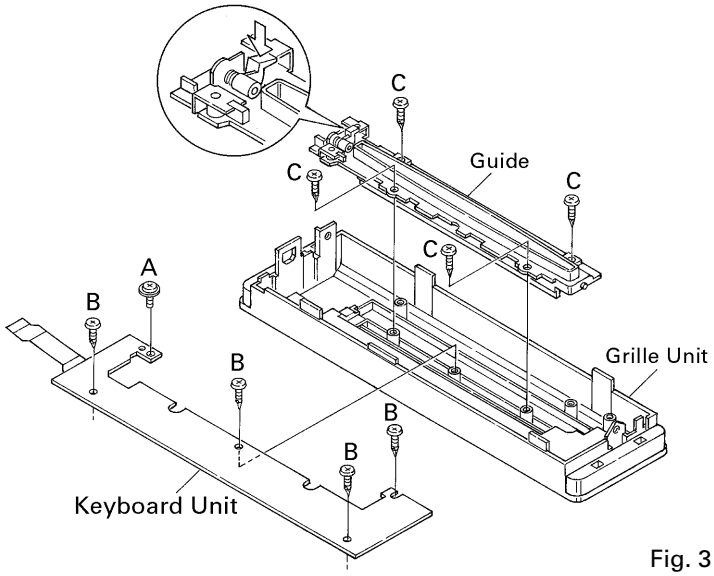


Fig. 3

● How to remove the Tray Assy

1. Apply about 6V current to the Cam gear motor until all holes match at the position (A) (elevation OK position).
2. Hook the three springs B temporarily as shown in Fig. 5. While pushing the Tray holder lock arms (right and left) in the direction (C), remove the Tray holder.
3. Lift up the Tray assy to remove it.

* Be careful not to remove the Tray hooks from the Tray assy.

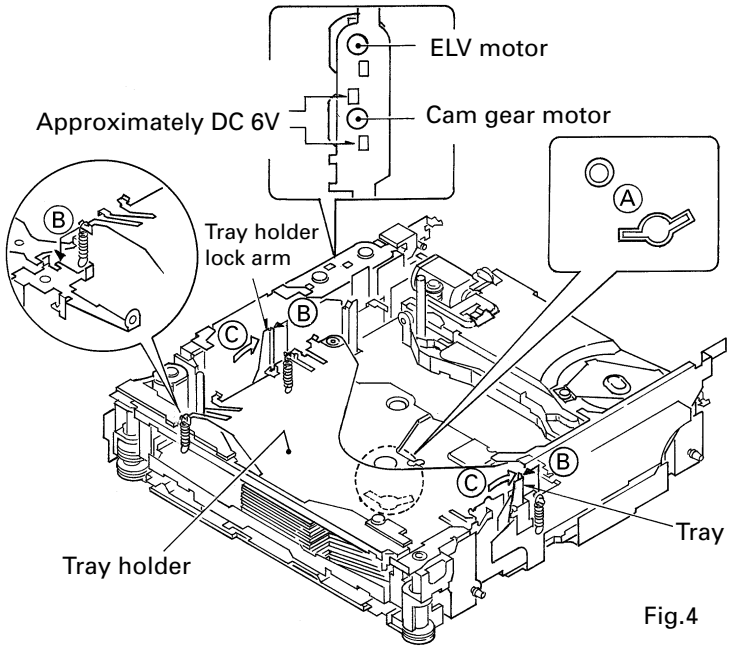


Fig.4

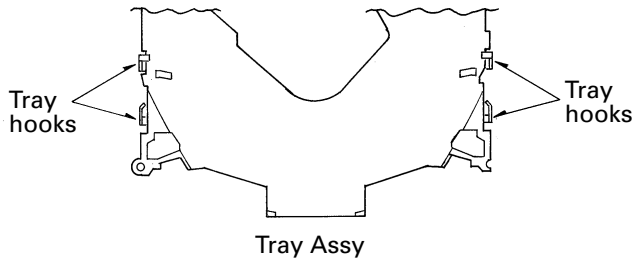


Fig. 5

● How to remove the Carriage Mech Assy

1. Insert a short pin into the flexible PCB of the Pickup unit.
2. While opening the resin hooks, remove the cover from the Servo unit.
3. Disconnect the flexible PCBs from the connectors CN101 and CN301.
4. Remove the Tray holder and the Tray assy. (See above)
5. Rotate the Cam gear motor until the positions of all holes (E) match, then stop the motor.
   (The Carriage Mech assy will stop as shown in the Fig.7.)

* When the positions of all holes match, they will be completely covered by the Carriage mech assy.

* To rotate the Cam Gear motor, see "How to remove the Tray assy".

6. Unhook the spring A.
7. Remove the flexible holder B (while opening the hooks).
8. Remove the flexible PCB (C) from the motor. (The flexible PCB (C) has been stuck on the motor with double-sided adhesive tape.)
9. Loosen the fixing screw and remove the flexible holder.

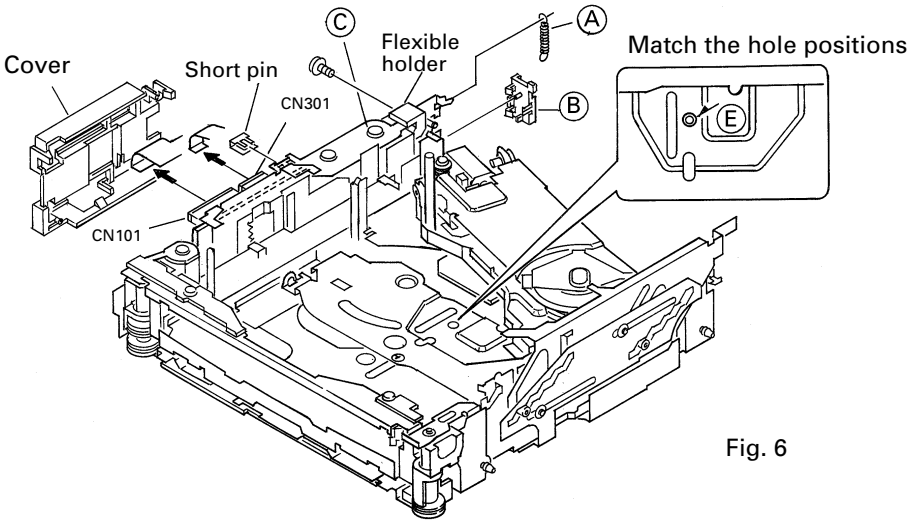


Fig. 6

10. Remove the screw, pressure spring and collar. Lift up the Carriage mechanism assy to remove it.
    * Screw tightening torque: 2.6kgfcm

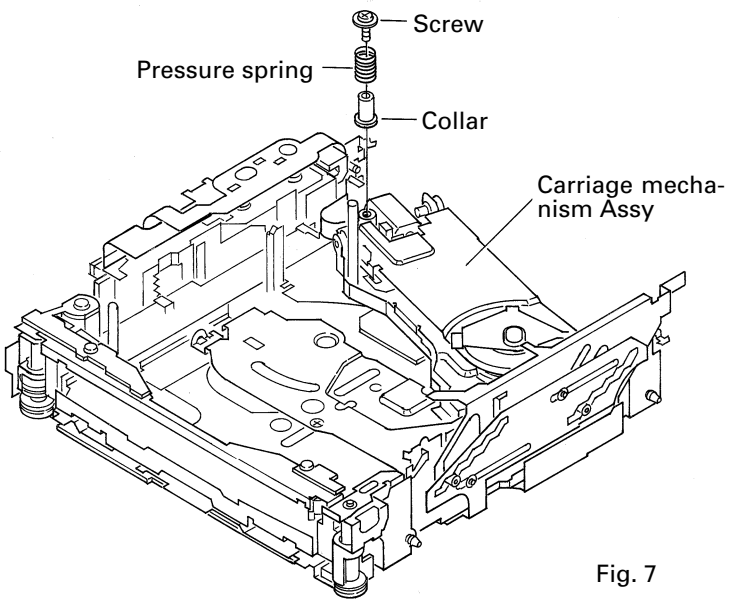


Fig. 7

● How to remove the Pickup unit

1. Remove the pulling spring, torsion spring and E-shaped ring. Then remove the Clamper arm.

* The spring (A) will be removed with the Clamper arm.

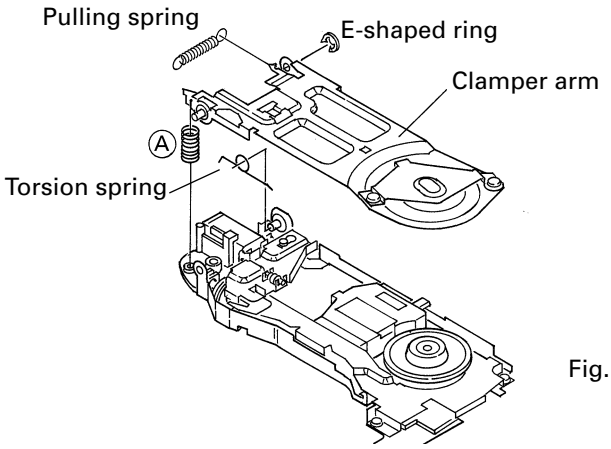


Fig. 8

2. Slide the Clamp UP lever (B) to remove it.
3. Loosen the 2 screws. Remove the feed-screw cover by sliding it.
4. Remove the feed-screw pressure spring (D).
5. Loosen the 2 screws. Remove the feed-screw holder (E).
6. Remove the belt.
7. Remove the Pickup unit together with the feed screw.

* Be careful not to lose the shaft holders at the both ends of the feed screw.
* Be careful not to damage the 2 flexible PCBs(for the Pickup and motor) when separating them. The flexible PCBs have been stuck each other with double-sided adhesive tape.

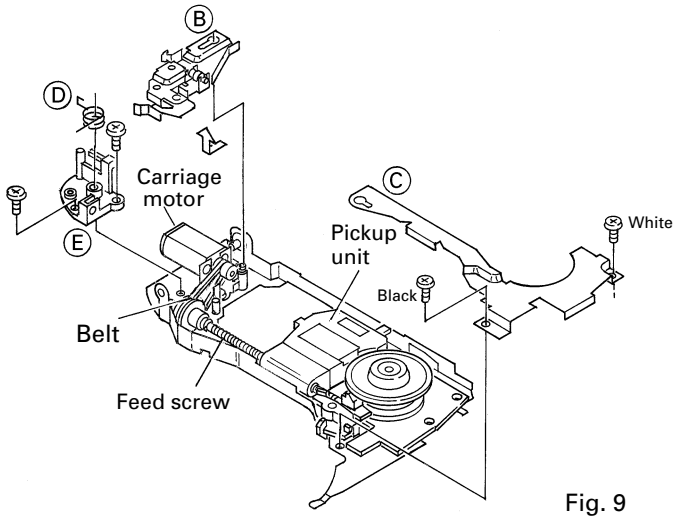


Fig. 9

8. Loosen the 2 screws. Remove the plate spring and the rack.
9. Pull out the feed screw from the Pickup unit.

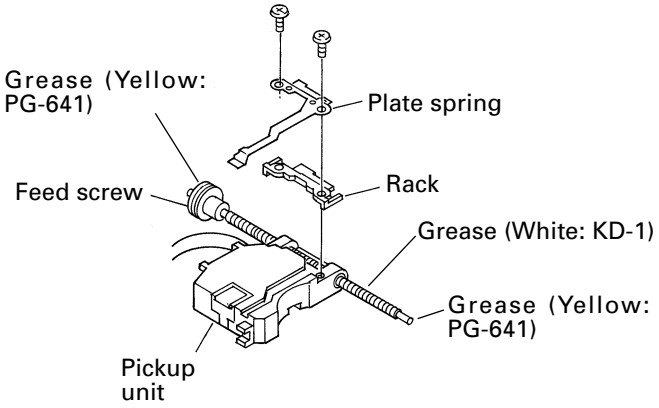
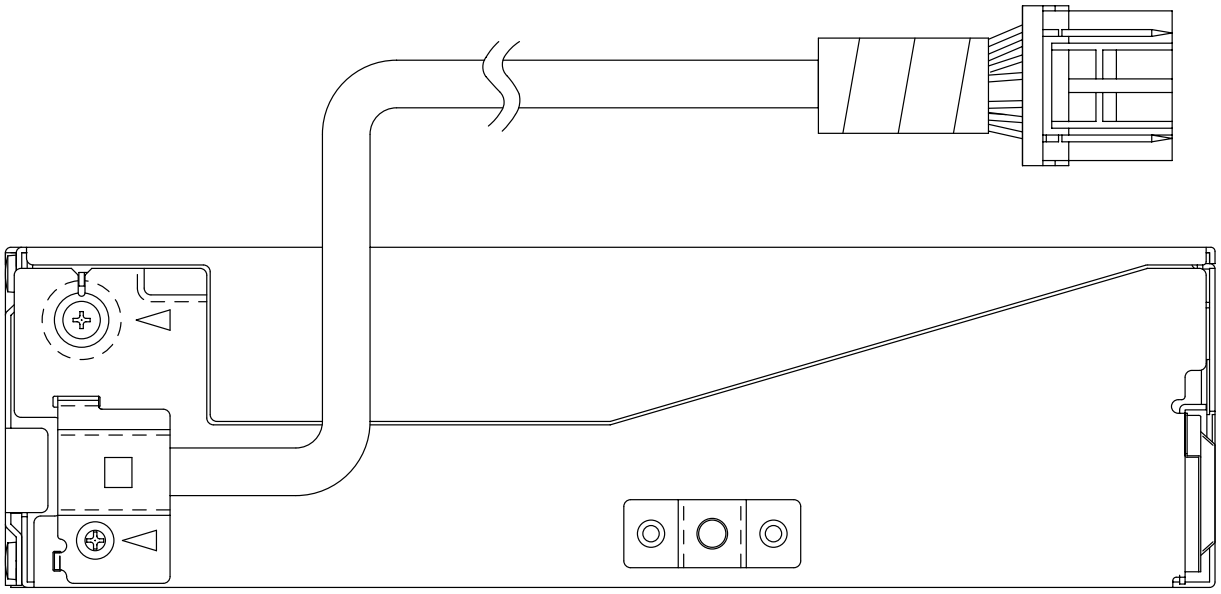
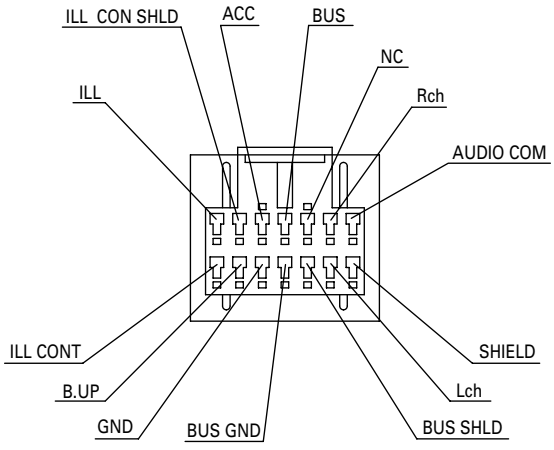


Fig. 10

7.1.3 CONNECTOR FUNCTION DESCRIPTION





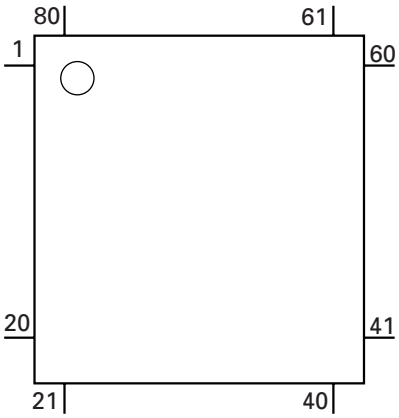
7.2 IC

● **Pin Functions (PD5470A)**

Pin No.	Pin Name	I/O	Function and Operation
1	VDIN	I	VD power supply sensor input
2	DOORSW	I	Door open position sense input
3	NC		Not used
4	ASO	O	IP-BUS dada output
5	CLAMPSW	I	Disk clamp sense input
6	ELHOME	I	Elevation sense input
7	XSCK	O	LSI clock output
8	XSO	O	LSI data output
9	XSI	I	LSI data input
10	$\overline{\text{XSTB}}$	O	LSI strobe output
11	$\overline{\text{XRST}}$	O	LSI reset output
12	XA0	O	LSI data discernment control signal output
13	VDCONT	O	VD power supply control output
14	EJECTKEY	I	Eject key input
15	$\overline{\text{ASENS}}$	I	ACC power sense input
16	ASI	I	IP-BUS dada input
17	LOADSW	I	Loading sense input
18	ELVSW	I	Elevation OK input
19–21	NC		Not used
22	$\overline{\text{BSENS}}$	I	Back up power sense input
23	$\overline{\text{SBSY}}$	I	Signal indicating head of subcode block input
24	NC		Not used
25	$\overline{\text{RESET}}$	I	Reset input
26	POWER	O	+5V power supply control output
27	CONT	O	Servo driver power supply control output
28	XIN	I	Crystal oscillating element connection pin
29	XOUT	O	Crystal oscillating element connection pin
30	VSS		GND
31–33	KST1-3	O	Key strobe output
34,35	$\overline{\text{KD1}}$,$\overline{2}$	I	Key data input
36,37	ILL1,2	O	Illumination output
38	AD		Address bus
39	TESTIN	I	Test program mode input
40	DCLOSE	I	Door close sense input
41	WDSL	O	Data comparison designation output
42	XWIH	I	DRAM data white inhibit input
43	XEMP	I	DRAM data read inhibit input
44	CHDT	I	Data comparison mode monitor input
45,46	CHM0,1	O	Data comparison mode output
47-49	NC		Not used
50	XWRE	O	DRAM data white enable output L:enable
51	XRDE	O	DRAM data read enable output L:enable
52	XQOK	O	SUB-Q OK output L:SUBQ OK
53	EMPH	O	DAC EMPH output
54	SCONT	O	Double speed select output
55	LOAD	O	LED power supply control output
56	$\overline{\text{CDMUTE}}$	O	Mute output
57,58	LO2,1	O	Load motor control output
59,60	ELV2,1	O	ELV motor control output
61,62	CG2,1	O	CAM motor control output
63	MIRR	I	Mirror detector input
64	LOCK	I	Spindle lock detector input
65	FOK	I	FOK signal input
66	EXSCK	O	Shift clock output
67	EXMODE	O	Latch clock output
68	EXSO	O	Serial data output

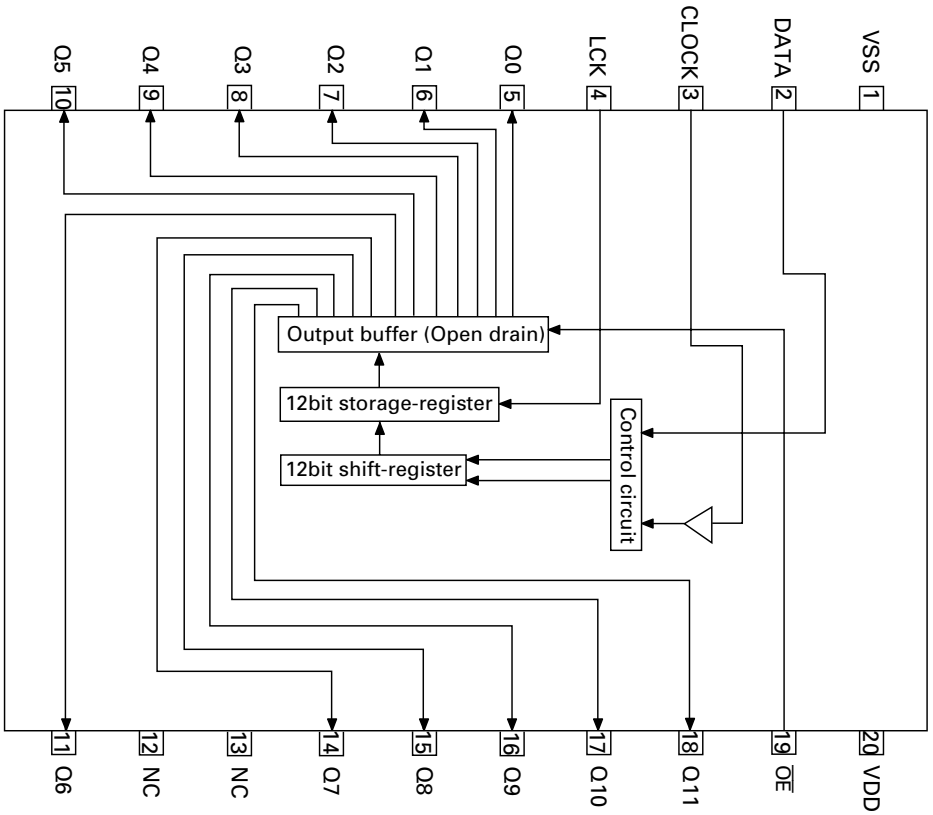
Pin No.	Pin Name	I/O	Function and Operation
69	EXCE	O	Chip enable output
70	INDICATOR	O	Illumination power supply control output
71	VCC		Power supply terminal
72	VREF	I	A/D converter reference voltage input
73	AVSS	I	A/D converter GND
74	ADRMON	I	DRAM memory remaining monitor input
75	EREF	I	DRAM A/D converter reference voltage input
76-78	PH1-3	I	Disc photo sense input
79	ELVSNS	I	ELV position sense input
80	TEMP	I	Temperature detector input

*PD5470A

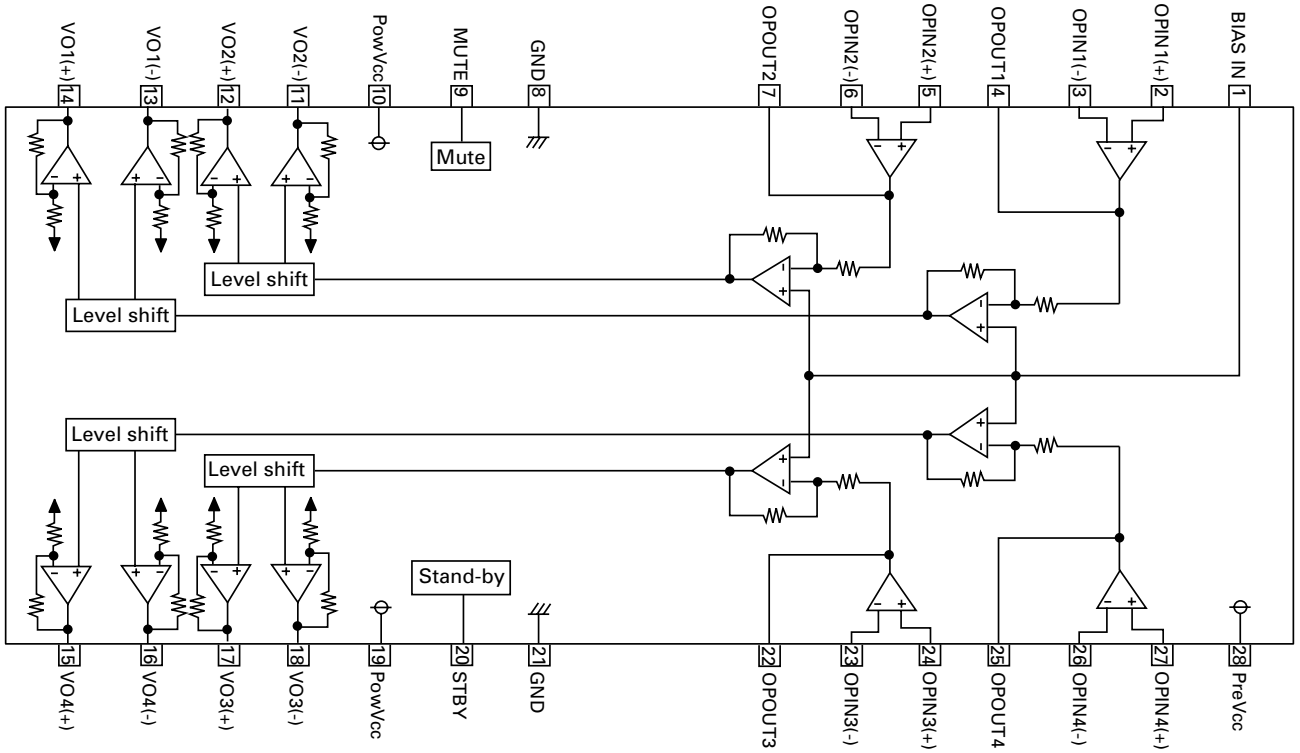


IC's marked by* are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

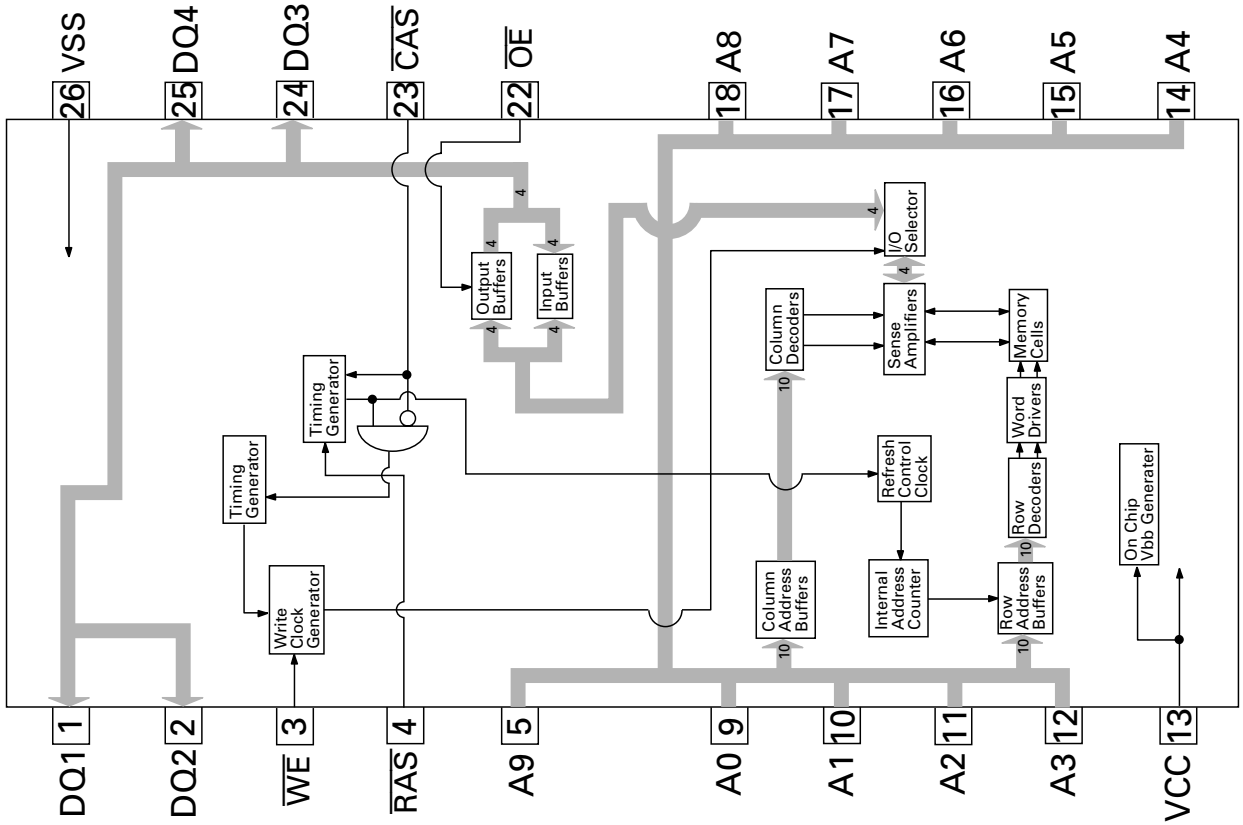
BU2092FV



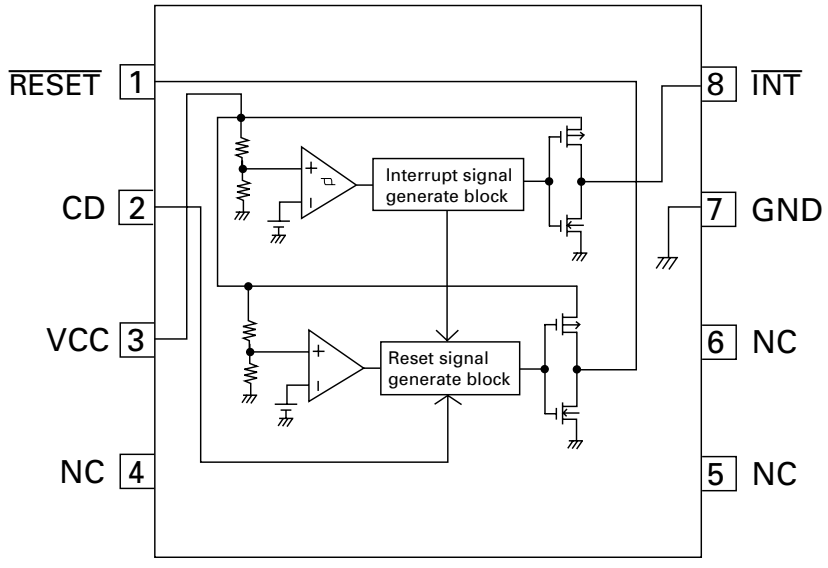
BA5986FM



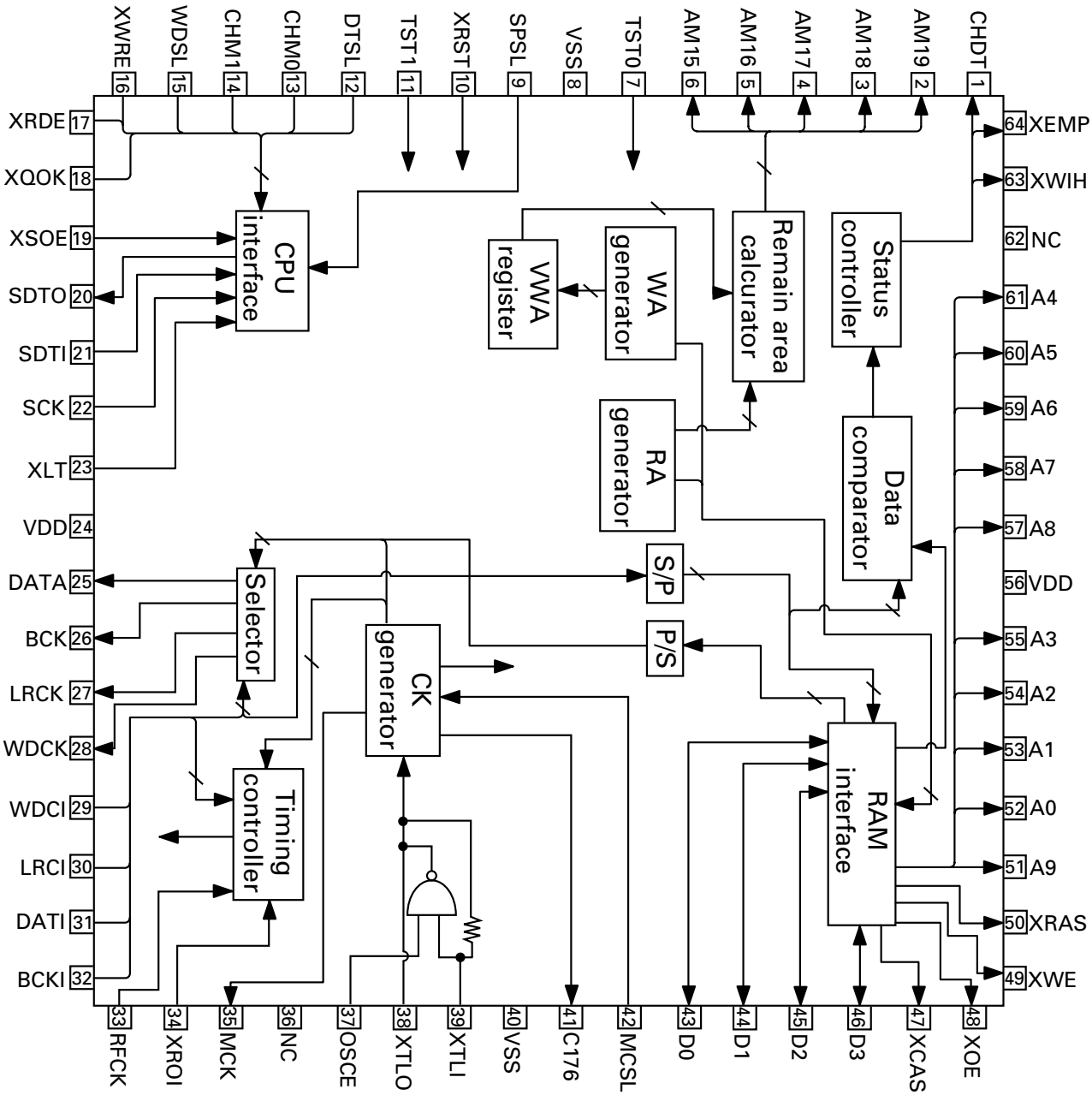
MSM514400DP-60TS



M62007FP



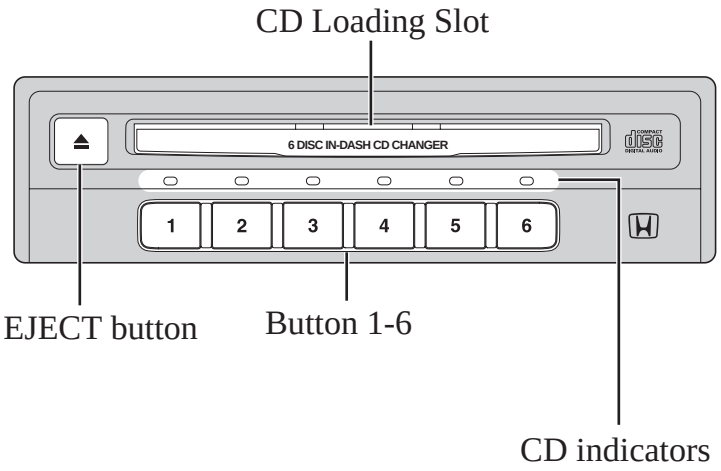
CXD2511R


XWRE 16
WDSL 15
CHM1 14
CHM0 13
DTSL 12
TST1 11
XRST 10
SPSL 9
VSS 8
TST0 7
AM15 6
AM16 5
AM17 4
AM18 3
AM19 2
CHDT 1
XRDE 17
XQOK 18
XSOE 19
SDTO 20
SDTI 21
SCK 22
XLT 23
VDD 24
DATA 25
BCK 26
LRCK 27
WDCK 28
WDCI 29
LRCI 30
DATI 31
BCKI 32
64 XEMP
63 XWIH
62 NC
61 A4
60 A5
59 A6
58 A7
57 A8
56 VDD
55 A3
54 A2
53 A1
52 A0
51 A9
50 XRAS
49 XWE
CPU interface
VWA register
WA generator
Remain area calcurator
Status controller
RA generator
Data comparator
S/P
P/S
Selector
CK generator
Timing controller
RAM interface
33 RFCK
34 XROI
35 MCK
36 NC
37 OSCE
38 XTLO
39 XTLI
40 VSS
41 C176
42 MCSL
43 D0
44 D1
45 D2
46 D3
47 XCAS
48 XOE

8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATIONS

Key Finder



CD indicators		Status
Green	Lit	A CD is loaded.
	Flashing	The unit is in the CD loading standby mode.
		The unit is standing by during ejection of all the CDs.
Orange	Lit	The currently selected CD.
	Flashing	A CD is being loaded, changed or ejected.
Out		No CD is loaded.
		Power is switched OFF.

8.2 SPECIFICATIONS

General

Power source ..... 13.2 V DC (10.8 – 15.2 V allowable)
Grounding system ..... Negative type
Standby current ..... 2 mA or less
Rated current consumption ..... 600 mA max.
Maximum current consumption ..... 1.5 A max.
Dimensions (chassis size) ..... 180 (W) × 50 (H) × 165 (D) mm
[7-1/8 (W) × 2 (H) × 6-1/2 (D) in.]
Weight ..... 1.6 kg (3.5 lbs)

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16;linear
Frequency characteristics ..... 20 – 20,000 Hz
Signal-to-noise ratio ..... 92 dB (1kHz) (IHF-A network)
Dynamic range ..... 92 dB (1kHz)
Number of channels ..... 2 (stereo)

Service Manual

ORDER NO.
CRT2376

CD MECHANISM MODULE

CX-890

NOTE:

- **This Service Manual outlines operations of the CD mechanism module used in the models listed blow.**
- **For repair, use this Service Manual and the Service Manual of the model used in the system.**

Model	Service manual	CD mechanism module	CD mechanism unit
CDX-PD6/UC	CRT2372	CXK4701	CXB2700

CONTENTS

1. MAIN PARTS LOCATIONS.....2
2. CIRCUIT DESCRIPTIONS.....3
3. MECHANISM OPERATIONS.....16
4. DISASSEMBLY.....21

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

© **PIONEER ELECTRONIC CORPORATION 1999**

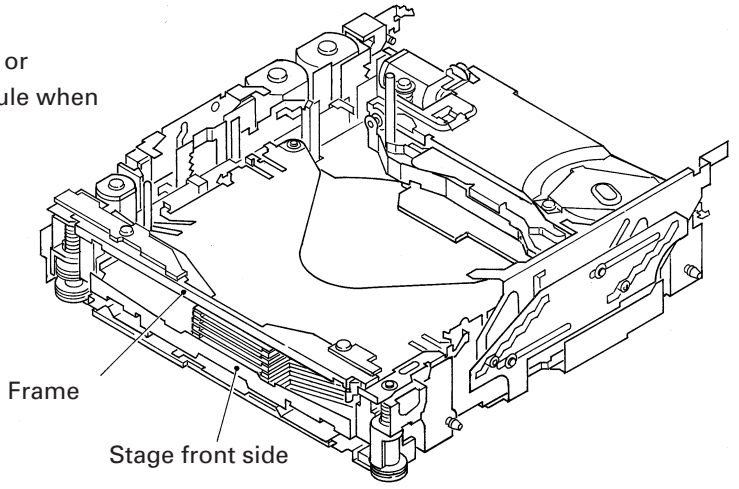
K-ZZS. FEB. 1999 Printed in Japan

● **CD Player Service Precautions**

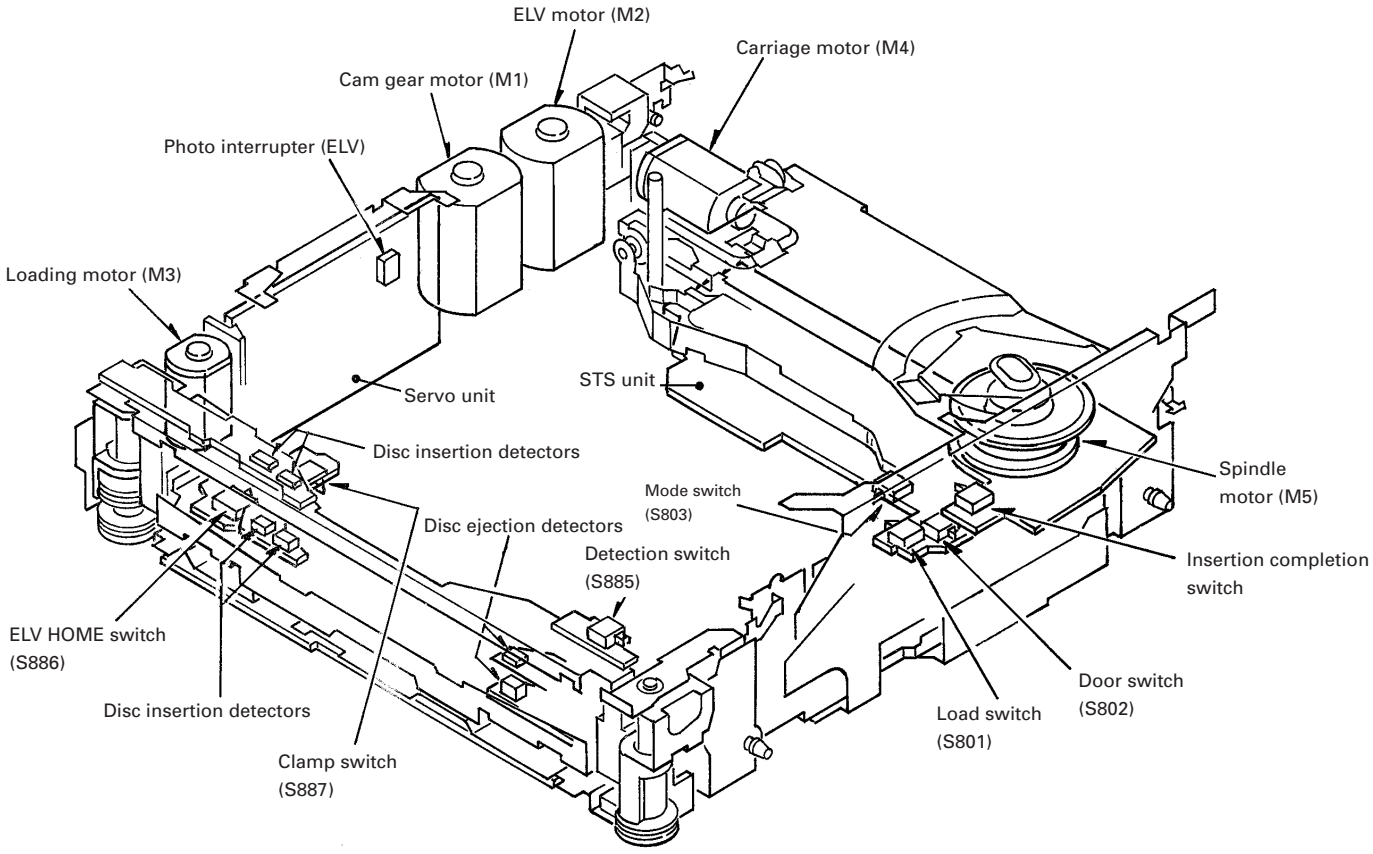
1. For pickup unit(CXX1311) handling, please refer to"Disassembly"(Page 21).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).

Do not hold the upper frame of the disc insertion slot or the front side of the stage in the CD mechanism module when servicing to prevent them from being deformed.

2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.



1. MAIN PARTS LOCATIONS



2. CIRCUIT DESCRIPTIONS

2.1 Preamplifier (UPC2572GS: IC101)

The preamplifier processes pickup output signals to generate signals to be sent to the servo, demodulator, and controller. The preamplifier with built-in photodetector converts signals from the pickup into intermediate voltage in the pickup. Then, addition is made in the RF amplifier (IC101) to obtain RF, FE, TE, and TE zero cross signals. The system consists of the UPC2572GS and other components explained below. The system uses a single power source (+5 V). Therefore, the reference voltage of IC101 and the reference voltage of the power unit and servo circuit are REFOUT (+2.5 V). REFOUT is obtained from REFOUT of servo LSI (IC201: UPD63702GF) via a buffer, and is output from Pin 19 of IC101. This REFOUT is used as reference for all measurements.

Note:Do NOT short-circuit REFOUT and GND during measurement.

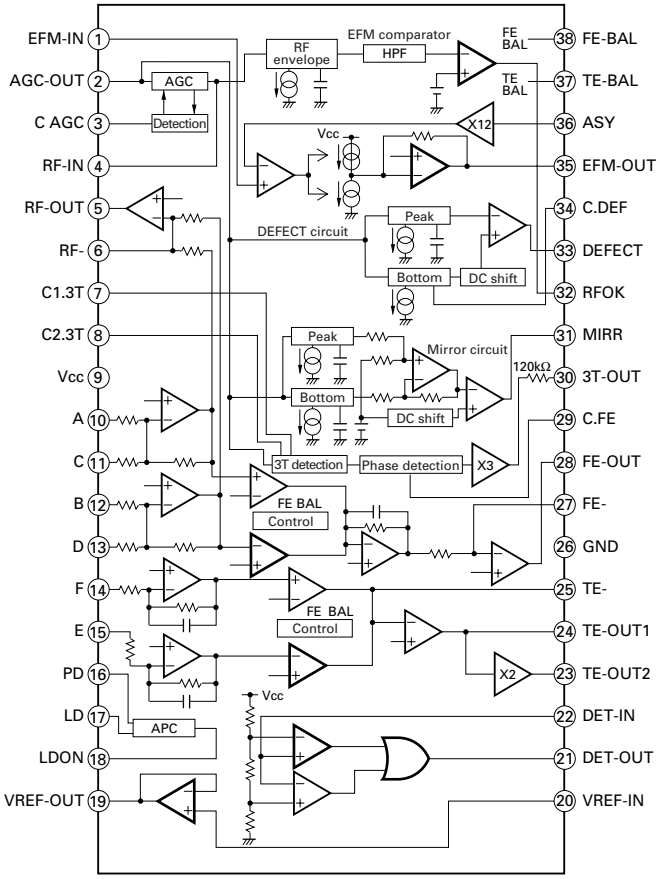


Fig. 1 Block Diagram of UPC2572GS

1) Automatic Power Control (APC) circuit

Laser diode has negative temperature characteristics with great optical output when the diode is driven with constant current. Therefore, current must be controlled by a monitor diode to ensure constant output. Thus functions the APC circuit. LD current can be obtained by measuring the voltage between LD1 and GND. The current value is approximately 35 mA.

$$\text{LD current(mA)} = \frac{\text{Voltage between LD1 and GND(mv)}}{10\ \Omega + 12\ \Omega}$$

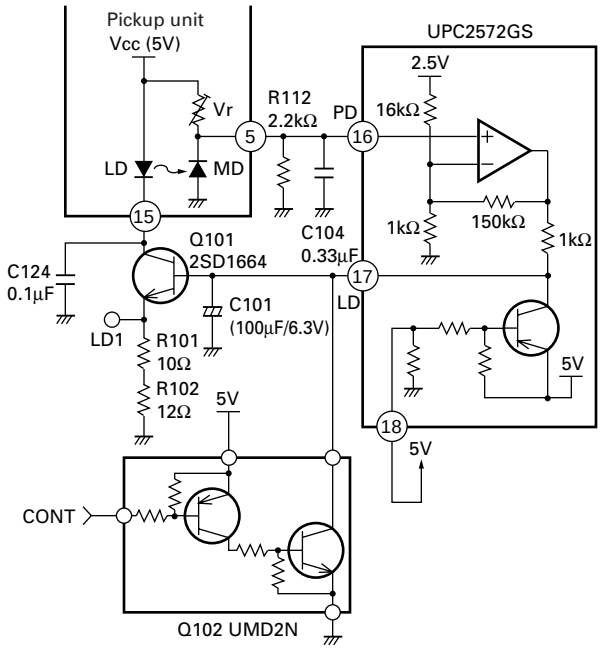


Fig. 2 APC Circuit

2) RF amplifier and RF AGC amplifier

Photodetector outputs (A+C) and (B+D) are added, amplified and equalized in IC101, and output to the RFI terminal as RF signal. (Eye pattern can be checked at this terminal.)

Low-frequency components of voltage RFI is:

$$RFI = ((A + C) + (B + D)) \times 3.22$$

where R111 is offset resistor to keep RFI signal within the output range of the preamplifier. RFI signal is goes under AC coupling, and is input to Pin 4 (RFIN terminal).

IC101 contains an RF AGC circuit. RFO output from Pin 2 is maintained to a constant level (1.2 ±0.2 Vp-p). The RFO signal is used in the EFM, DFCT, and MIRR circuits.

3) EFM circuit

The EFM circuit converts RF signal into digital signals of "0" and "1". RFO signal after AC coupling is input to Pin 1, and supplied to the EFM circuit.

Asymmetry caused during manufacturing of discs cannot be eliminated solely by AC coupling. Therefore, the system controls the reference voltage ASY of the EFM comparator by using the fact that probability to generate "0" and "1" is 50% in EFM signal. This reference voltage ASY is generated by output from the EFM comparator through L.P.F. EFM signal is output from Pin 35. As signal level, amplification is 2.5 Vp-p around REFOUT.

4) DFCT (defect) circuit

DFCT signal detects mirror defect in discs, and is output from Pin 33. The system outputs "H" when a mirror defect is detected.

If disc is soiled, the system determines it as lack of mirror. Therefore, the system inputs the DFCT signal output to the HOLD terminal of servo LSI. Focus and tracking servo drives change to Hold status only when DFCT output is in "H" so that performance of the system upon detection of defect can be improved.

5) RFOK circuit

The RFOK circuit outputs signal to show the timing of focus closing servo, as well as the status of focus closing during playback. The signal is output from Pin 32. The system inputs the RFOK signal output to the RFOK terminal of servo LSI. The servo LSI issues Focus Close command. The system outputs signal in "H" during focus closing and playback.

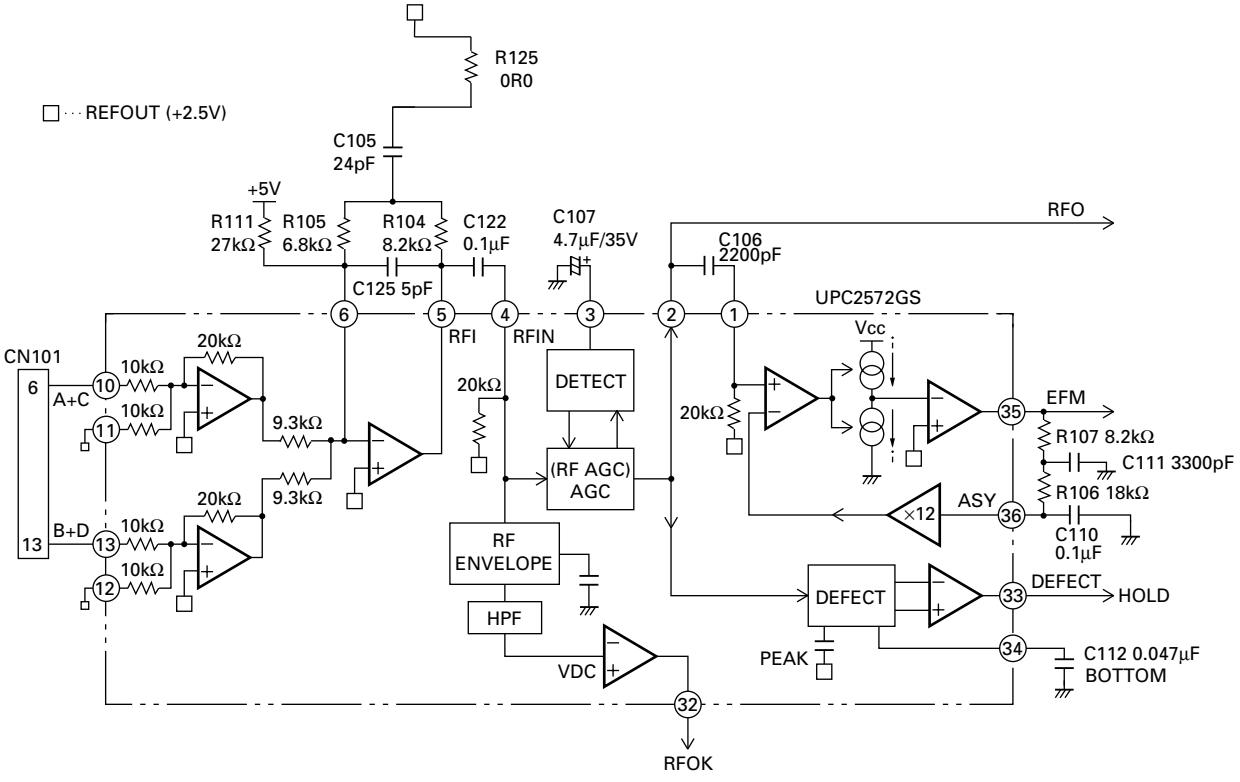


Fig. 3 RF AMP, RF AGC, EFM, DFCT, RFOK Circuit

6) Focus-error amplifier

The system outputs photodetector output (A+C) and (B+D) as FE signal (A+C)-(B+D) from Pin 28 via the difference amplifier, then via the error amplifier.

Low-frequency components of voltage FEY is:

$$FEY=(A+C)-(B+D)\times\frac{20k\Omega}{10k\Omega}\times\frac{90k\Omega}{68.8k\Omega}\times\frac{R108}{17.2k\Omega}$$

: (FE level of pickup unit x 5.02)

An S curve equivalent to approximately 1.6 Vp-p is obtained at FE output (Pin 28) by using REFO as reference. The cut-off frequency of the amplifier of the last layer is 12.4 kHz.

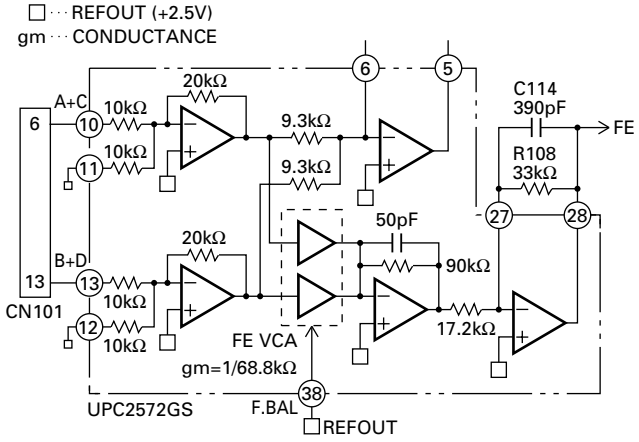


Fig. 4 Focus-error amplifier

7) Tracking-error amplifier

Outputs E and F from the photodetector are output as TE signal (E-F) from Pin 24 via the difference amplifier, then via the error amplifier.

Low-frequency components of voltage TEY is:

$$TEY=(E-F)\times\frac{63k\Omega}{(31k\Omega+16k\Omega)}\times\frac{68k\Omega}{17k\Omega}$$

: (TE level of pickup unit x 5.36)

TE waveforms equivalent to approximately 1.5 Vp-p are obtained at TE output (Pin 24) by using REFO as reference. The cut-off frequency of the amplifier of the last layer is 19.5 kHz.

8) Tracking zero-cross amplifier

Tracking zero-cross signal (TEC signal) is generated by amplifying TE waveforms (voltage at Pin 24) by a factor of four. The signal is used for detecting the zero-cross point of tracking error in the servo LSI UPD63702AGF. The purposes of detecting the zero-cross point are as follows:

(1)To be used for counting tracks for carriage move and track jump.

(2)To be used for detecting the direction of lens movement when tracking is closed. (To be used in the tracking brake circuit mentioned later.)

The frequency range of TEC signal is from 500 Hz to 19.5 kHz.

Voltage TEC = TE level x 4

In other words, the TEC signal level is calculated as 6 Vp-p. This level exceeds the D range of the operation amplifier, resulting in the signal to clip. However, there shall be no problem, since the servo LSI uses only zero-cross point.

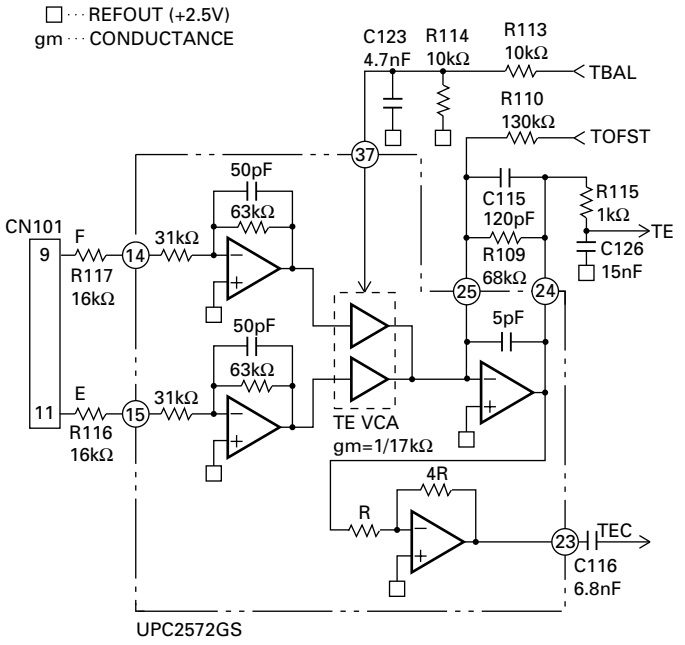


Fig. 5 Tracking-error amplifier, Tracking zero-cross amplifier

9) MIRR (mirror) circuit

MIRR signal shows ON and OFF track information. The signal is output from Pin 31.

The status of MIRR signal is as follows:

Laser beam ON track: MIRR = "L"

Laser beam OFF track: MIRR = "H"

The signal is used in the brake circuit mentioned later.

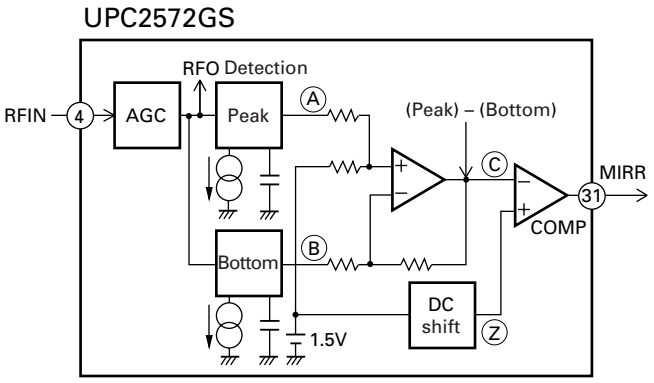


Fig.6 MIRR Circuit

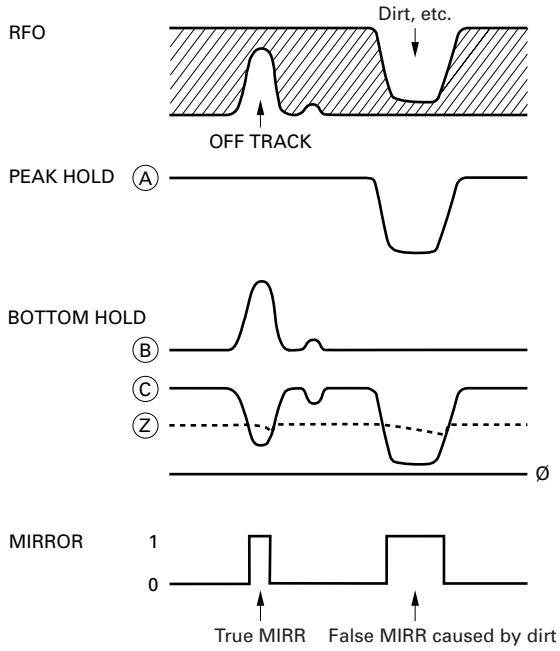


Fig. 7 MIRR Circuit

10) 3T OUT circuit

The system detects flickering of RF signal when disturbance is input to the focus servo loop, and outputs the difference of phase between FE signal and RF-level fluctuation signal from Pin 30. The resulting signal is obtained through L.P.F. with a fc of 40 Hz. This signal is used for automatic adjustment of FE bias.

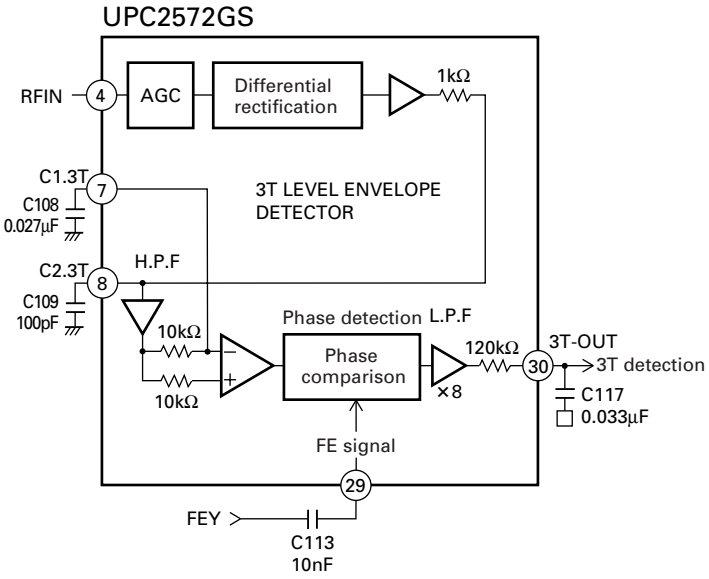


Fig. 8 3T OUT Circuit

2.2 Servo (UPD63702AGF: IC201)

The servo consists of mainly two parts. The first part is the servo processing unit to equalize error signals and control track jump, carriage move, in focus, etc. The second part is the signal processing unit to perform data decoding, error correction, and interpolation.
The system converts FE and TE signals from analog to digital in IC201, then outputs drive signals of the focus, tracking, and carriage systems via the servo block. The EFM signal input from the preamplifier is decoded by the signal processing unit, and eventually output as audio signal after conversion into analog from digital signals via the DA converter (IC201 contains audio DAC). Then, the system generates error signal for the spindle servo in the decoding process, sends the signal to the spindle servo to generate drive signal for spindle.
After that, drive signals for focus, tracking, carriage, and spindle are amplified in IC301 and BA5986FM, and supplied to respective actuators and motors.

1) Focus servo system

The main equalizer of focus servo is located in the UPD63702AGF. Fig. 9 shows block diagram of the focus servo.
For the focus servo system, the lens must be positioned within the focusing range in order to perform focus closing. To achieve this, the system moves the lens upward/downward by focus-search voltage of triangular waveform to detect the focusing point. During searching, the system kicks the SPDL motor to maintain rotation speed to set speed.
The servo LSI monitors FE and RFOK signals so that focus closing is performed automatically at an appropriate point.
Focus closing is performed when the following four conditions are satisfied:
(1)When the lens moves nearer to the disc.
(2)RFOK = "H"
(3)FZD signal (in IC) is latched to "H"
(4)FE = 0 (REFOUT as reference)

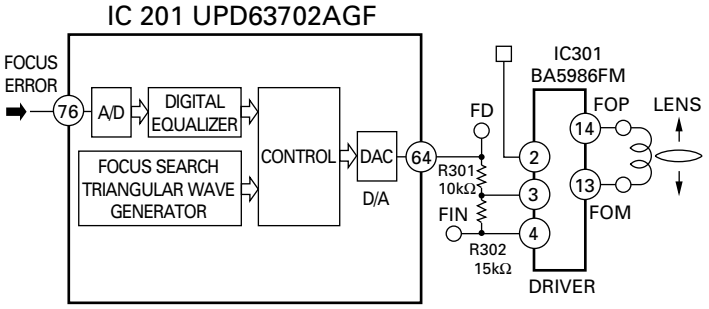


Fig. 9 Focus servo block diagram

When the conditions mentioned above are satisfied and focus is closed, the XSO terminal changes from "H" to "L". Then, the microcomputer starts monitoring RFOK signal through L.P.F after 40 ms.
If the system judges RFOK signal as "L", the microcomputer takes actions, including protection.
Fig. 10 shows operations related to focus closing. (The illustration shows when the system cannot perform focus closing.) S curve, search voltage, and actual lens behavior can be checked by pressing the Focus Close button when "01" is shown in Focus Mode Select in Test mode.

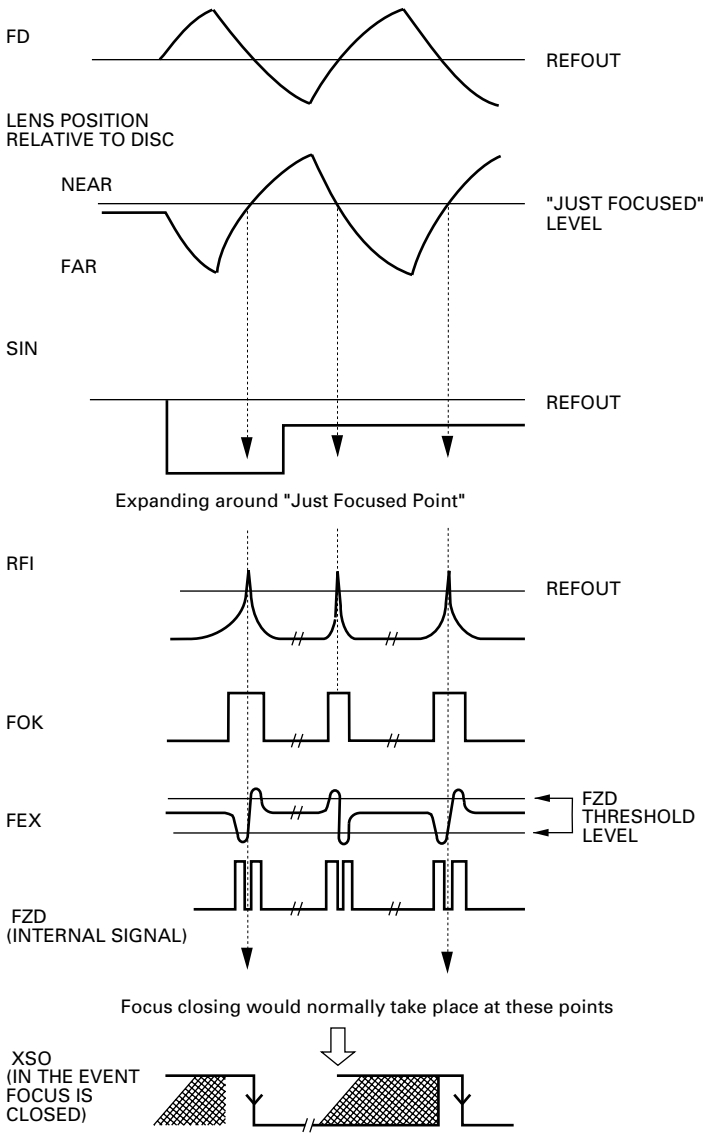


Fig. 10 Sequence of Focus Closing

2) Tracking servo system

The main equalizer of tracking servo is located in the UPD63702AGF. Fig. 11 shows block diagram of the tracking servo.

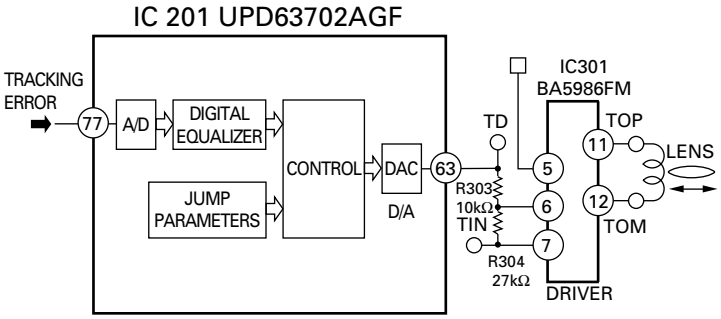


Fig. 11 Tracking servo block diagram

a) Track jump

Track jump is automatically performed by the auto sequence function in LSI when the LSI accepts command. The system has six types of jump (1, 4, 10, 32, 32x2, and 32x3) for truck jump during searching. In Test mode, the system can select and check these jump types and CRG move by selecting a mode. The microcomputer sets half of the total number of track jumps (two tracks if the total number of tracks are four), and counts the set number of tracks by using TEC signal.

The system outputs brake pulse for a specified time (set by the microcomputer) from the point of time when the set number is counted, and stops the lens. Thus, tracking is closed, and the system can continue normal playback.

To improve servo withdrawal during track jump, the system sets the brake circuit to ON for 60 ms after brake pulse so that gain of the tracking servo can be increased.

FF/REV in normal mode is made by continuously performing single jump approximately ten times faster than in normal playback.

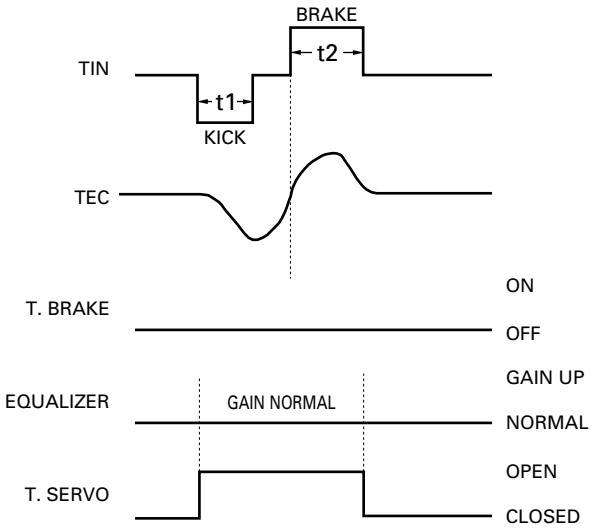


Fig. 12 Single track jump

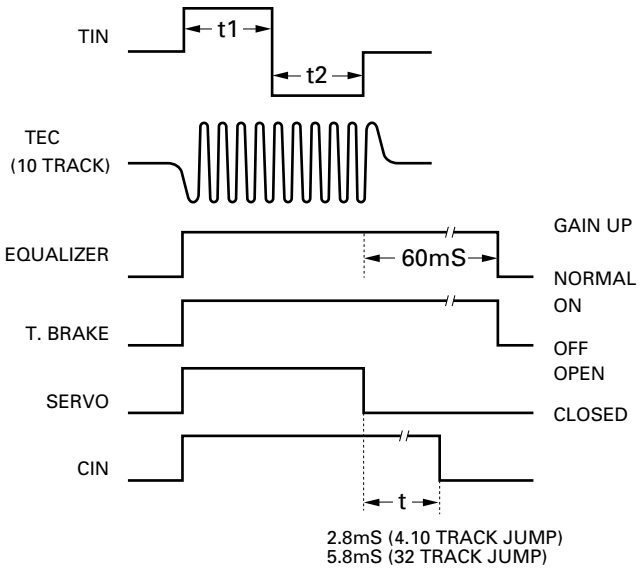
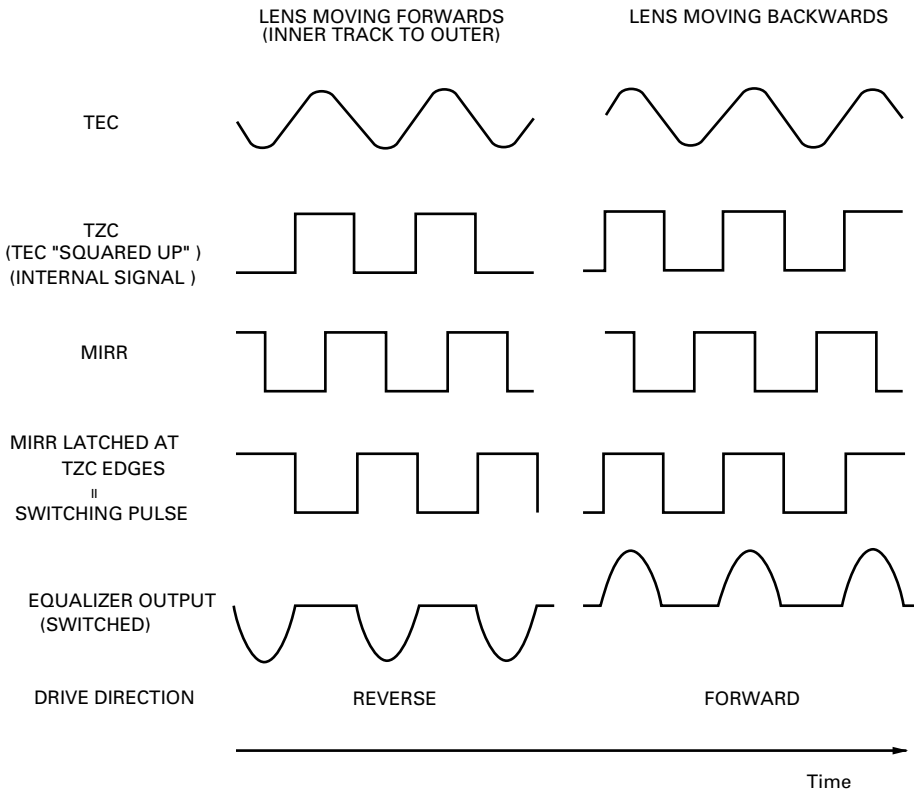


Fig. 13 Multi track jump

b) Brake circuit
Servo withdrawal will deteriorate during setting and track jump. Thus, the system uses the brake circuit to provide stable withdrawal to servo loop.
The brake circuit detects the direction of lens movement, and outputs only drive signal in the opposite direction from the lens movement. Thus, the system delays the speed of the lens movement to stabilize withdrawal of the tracking servo.
The system judges sliding direction of track from TEC and MIRR signals, as well as the relationship of their phase.



Note: In the illustration, the phase of equalizer output is shown as the same as with that of TEC.

Fig. 14 Tracking Brake Circuit

3) Carriage servo system

Output from low-frequency components (lens position information) of the tracking equalizer is input to the carriage equalizer by the carriage servo. After obtaining a certain gain, the system outputs drive signal from the servo LSI. The signal is then applied to the carriage motor via the driver IC. More specifically, the pickup unit as a whole must be moved forward when lens offset during playback reaches a specified level. Therefore, gain of equalizer is set so that voltage higher than the activation voltage of the carriage motor is output. As actual operation, a certain threshold level is set for equalizer output in the servo LSI, and drive voltage is output from the servo LSI only when the equalizer output level exceeds that level. Thus, power consumption is reduced. Depending on eccentricity, etc. of disc, the equalizer output voltage may cross the threshold level several times before the pickup unit as a whole starts operation. At this time, waveforms of drive voltage from LSI are output as pulse.

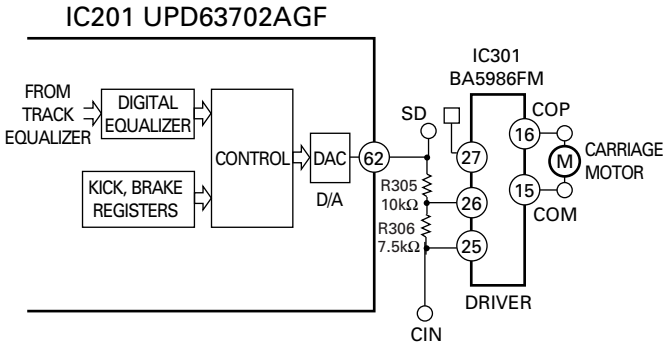


Fig. 15 Carriage Servo Circuit

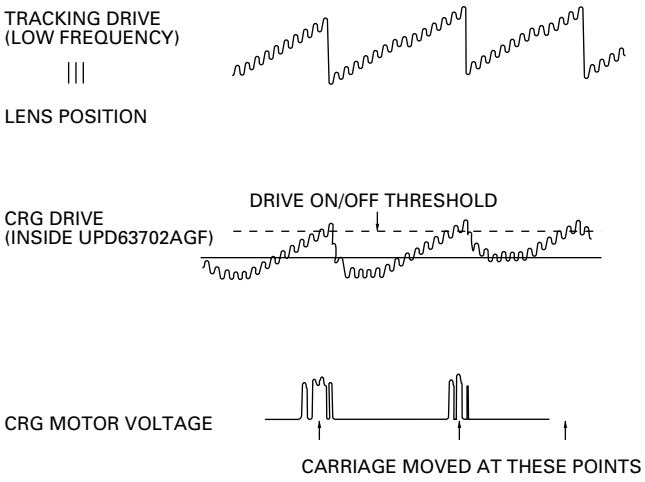


Fig. 16 Carriage Signal Waveforms

4) Spindle servo system

The spindle servo has the following modes:

(1)Kick mode:To be used for accelerating disc rotation during setting.

(2)Offset mode:

a)To be used after completion of kick until comple tion of spindle lock during setting.

b)If focus is out of range during playback, this mode is used until focus is recovered. In both cases, Offset mode is used for maintaining disc rotation to the speed close to specified rotation.

(3)Adaptive Servo mode: CLV servo mode during normal operation. The system samples every WFCK in 16 cycles whether frame synchronous signal matches output from the internal frame counter in EFM demodulation block, and generates signal that shows matching/unmatching status. If signal showing unmatching status continues for 8 times, the system deems it as asynchronous status. Except this case, the system judges as synchronous. In Adaptive Servo mode, the system automatically selects withdrawal servo for asynchronous status, and steady-state servo for synchronous status.

(4)Brake mode: Mode to stop the spindle motor. The microcomputer outputs brake voltage from the servo LSI. Waveforms of EFM are monitored inside the LSI. If the longest pattern of EFM exceeds specified intervals (if the rotation speed adequately slowed down), flag is activated in the LSI, and the microcomputer turns brake voltage to OFF. If no flag is activated after a specified time, the microcomputer changes from Brake to Stop mode. This status continues for a specified time. If the system changes to Stop mode during ejection, disc is ejected after the specified time mentioned above.

(5)Stop mode: To be used when the power is turned to ON, and during ejection. In Stop mode, the end-to-end voltage of the spindle motor is 0 V.

(6)Rough Servo mode: To be used when returning carriage (carriage move during long search, etc.). The system calculates linear speed from waveforms of EFM, and inputs either "H" or "L" level to the spindle equalizer. This mode is also used for confirmation of grating in Test mode.

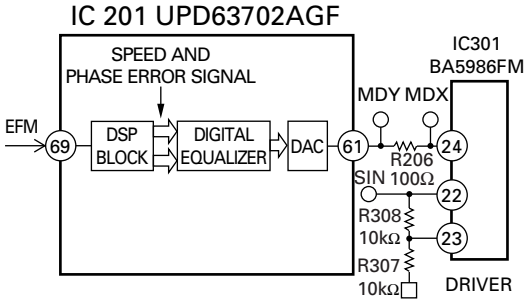


Fig. 17 Spindle servo block diagram

2.3 Automatic Adjustment Function

With this system, all circuit adjustments are automatically performed by using the preamplifier (UPC2572GS) and servo LSI (UPD63702AGF). All adjustments are automatically performed whenever disc is inserted or CD mode is selected by the Source key. Details of automatic adjustments are as follows:

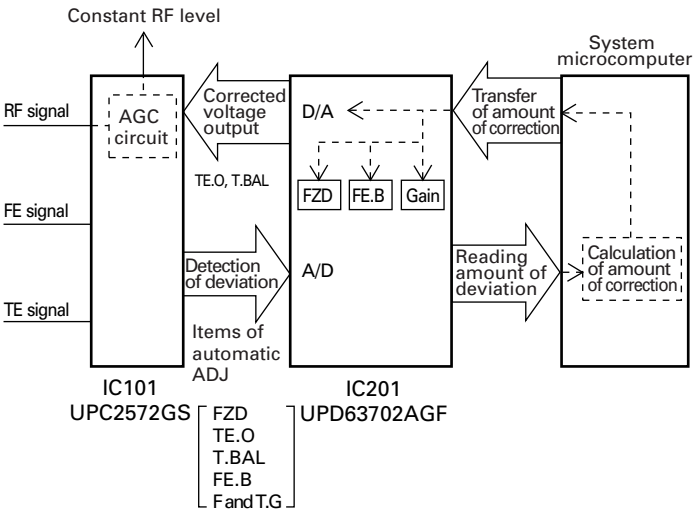


Fig. 18 Outline of Automatic Adjustment

1) Setting of FZD cancellation

This setting ensures focus closing. The system reads the FE offset level when the power is turned to ON, then writes the inverse voltage of offset value of that level to CRAM inside IC to cancel offset. Thus, the threshold level of FZD can be set to a constant value (+150 mV). As a result, "Latching FZD signal to H", which is one of the conditions required for focus closing in IC, is ensured.

2) TE offset automatic adjustment

Adjusts TE amplifier offset of the preamplifier to 0 V when the power is turned to ON.

Adjustment is made as follows:

(1)The microcomputer reads TE offset in LD OFF status via the servo LSI (TE1).

(2)The microcomputer calculates the voltage to be corrected using the TE1 value, and outputs from Pin 65 (pin name: TOFST) of the servo LSI. More specifically, calculation is made as follows:

TOFST2 = TOFST1 + TE1 x R110 / R109

3) Tracking balance (T.BAL) automatic adjustment

To make the sensitivity of Ech of TE output equal to that of Fch. In fact, adjustment is made so that the upper and lower portions of TE waveforms are symmetric to REFOUT.

Adjustment is made in the following steps:

(1)After focus close, the system kicks the lens in the radial direction to ensure TE waveforms to be generated.

(2)The microcomputer reads the peak bottom of TE waveforms via the servo LSI.

(3)The microcomputer calculates the amount of offset, then calculates the voltage to be corrected based on that offset. The system outputs the result from Pin 66 (pin name: TBAL) of the servo LSI.

(4)The voltage output from the servo LSI is input to Pin 37 of the preamplifier (IC101: UPC2572GS). Pin 37 is a control-voltage terminal of the TEVCA amplifier. According to voltage input, the system changes gain of Ech and Fch in the preamplifier, and adjusts the tracking balance to make the upper and lower portions of TE waveforms symmetric to REFOUT.

4) FE bias automatic adjustment

Maximizes the RFI level by optimizing focus point during playback. Adjustment is made by using 3T level waveforms of RF waveforms and the phase difference generated by input of disturbance of focus error. Since adjustment is made by inputting disturbance to focus loop, the system uses the same timing as with auto gain control (mentioned later~) for adjustment.

Adjustment is made in the following steps:

(1)Disturbance is input to focus loop by the command from the microcomputer (inside the servo LSI).

(2)The system detects flickering of 3T components of RF signal in the preamplifier.

(3)The system checks the phase difference between 3T components mentioned above and FE signal caused by input of disturbance to detect the direction of focus deviation. The result is output as DC voltage from Pin 30 (3TOUT) of the preamplifier.

(4)The 3TOUT voltage is input to Pin 75 (A/D port) of the servo LSI. The microcomputer reads this 3TOUT voltage via the servo LSI.

(5)The microcomputer calculates the amount of correction required. The results are transferred to offset of focus loop in the servo LSI.

As with auto gain control, the system repeats the same adjustment process several times to improve adjustment precision.

5) Auto gain control (AGC)

AGC adjustment is already used in the CD modules of the previous generation. This function automatically adjusts servo loop gain of focus and tracking.
Adjustment is made in the following steps:

(1)Disturbance is input to servo loop.

(2)The system extracts error signals (FE and TE) upon input of disturbance via the B.P.F. and obtains signals of G1 and G2.

(3)The microcomputer reads G1 and G2 signals via the servo LSI.

(4)The microcomputer calculates required amount of correction to adjust loop gain in the servo LSI. The system repeats the same adjustment process several times to improve adjustment precision.

6) Initial adjustment value

For all automatic adjustments, the system uses the previous adjustment value as initial values, except when the power of the microcomputer has been turned to OFF (backup is turned to OFF). If backup has been turned to OFF, the system uses initial set value to perform automatic adjustment.

7) Display of coefficients of adjustment results

Results of automatic adjustments can be displayed in Test mode for confirmation. Display of coefficients in each automatic adjustment is as follows:

(1)FZD cancel, TE.OFST cancel, T.BAL, and FE bias
Reference = 32 (32: No adjustment was required)
Display is made in units of approximately 40 mV.
Example: Coefficient of FZD cancel = 35
35 - 32 = 3 3 x 40 mV = 120 mV
Corrected amount is approximately +120 mV.
Thus, FE offset before adjustment is -120 mV.

(2)Adjustment of F and T gain
Reference: Focus = 13, tracking = 20
The amount of reduced gain in comparison with the reference is known by looking at the coefficient dis played.
Example: AGC coefficient = 40
Amount of reduced gain = 20 log (20/40) = -6dB

2.4 Power Supply and Mechanism Control

The power supply VM (7.5V) is produced from the power supply VD (9.0V) supplied from the extension P.C. board, and used as the power supply for the loading motor driver, elevation motor driver, cam gear motor driver, and 5V Reg IC. As for the drive voltage for the disc detection LEDs and the power supply for the CD driver ICs, the power supply VD (9.0V) is used. The system IC controls the ON/OFF operations of the CD driver and laser diodes,the 5V power supply, and the drive voltage PVD for detection LEDs with "CONT", "POWER", and "LOAD" signals respectively.

2.5 STS(Sure Track System) Circuit

By pooling the musical data read in from a compact disc into the memory, even if the pickup should go off track for some reason, the Sure Track System enables prevention of sound interruption during recovery (approximately 3 seconds) by continuing to output data from the memory.

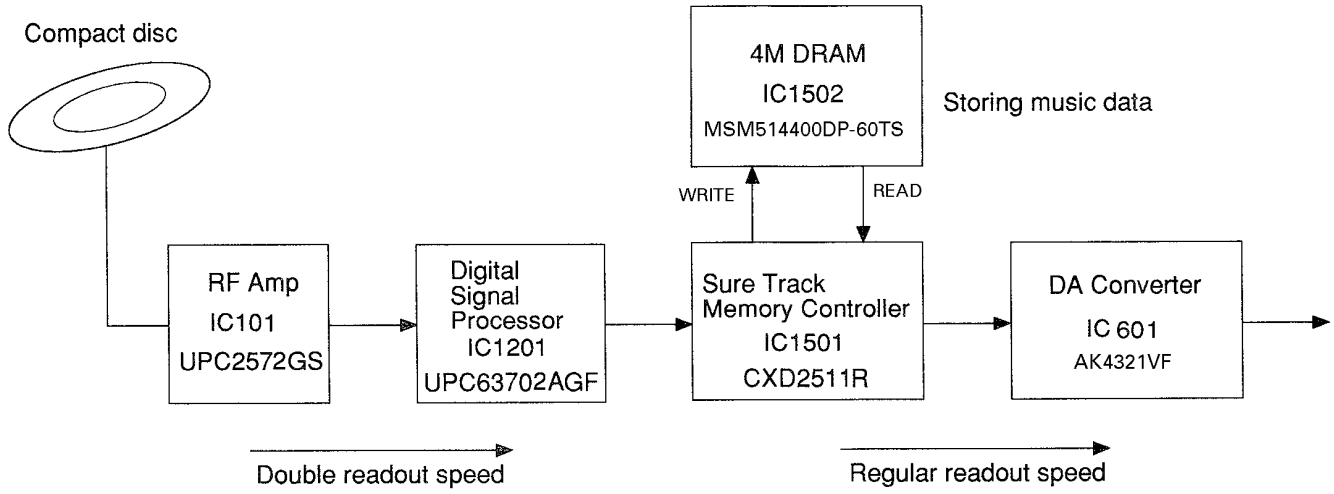


Fig. 19

Operation Principle

The STS circuit is controlled by the vibration free memory controller (CXD2511R). Data read in at double speed from a compact disc is input via the digital signal processing circuit into CXD2511R.

CXD2511R stores this DA data in DRAM (MSM5114400 DP-60TS), and reads and outputs the data at normal speed in synchronization with the internally generated FS system clock. In order to write the DA data at double speed and to read out at normal speed, the DRAM becomes full, but when it reaches capacity it will tentatively stop reading data. (The CD is in the pause mode during this time.) When an available area is created by data read-out from the DRAM, data writing will start again. (The available area of the DRAM can be monitored by ADRMON. By repeating this process, the DRAM is always used effectively, and approximately 2.67 seconds worth data can be stored. Even if the pickup should go off track due to vibrations for example, if recovered within 2.67 seconds while using the memorized data, sound interruption can be prevented.

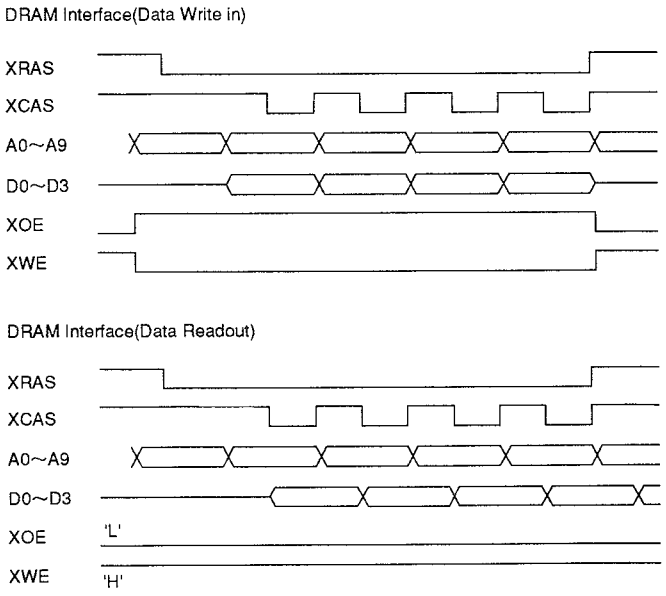


Fig. 20 TIMING CHART

3. MECHANISM OPERATIONS

3.1 Disc Insertion

a)The Cam gear rotates to the elevation OK position (See "How to remove the Tray Assy" on page 21). The Stage Mech Assy moves upwards or downwards to reach the height of the selected tray by using the elevation mechanism.

b)The Cam gear rotates counterclockwise until the LOAD switch is turned off. The Beak arms of the Stage Mech ASSY driven by the Cam gear's movement lift the selected tray.

c)The Stage Mech Assy with the tray lifted moves to the top position using the elevation mechanism.

* Disc insertion/ejection is performed at the top position (the 6th stage) irrespectively of tray position.

d)The Cam gear rotates counterclockwise to move the LOAD arms as shown in Fig.21.

e)The LOAD arms push the disc loaded on the tray and open the tray hooks.

f)When a disc is inserted, the disc interrupts the infrared LED light from the photo transistors, and the Rubber roller starts rotating.

* The photo transistors are connected in serial. When the light is interrupted from either photo-transistor, the start of disc insertion will be detected.

g)The disc is drawn in. Then the disc pushes the insertion completion switch via the arm.

h)The LOAD arms move forward to be released from the disc. At the same time, the tray hooks close to hold the disc on the tray.

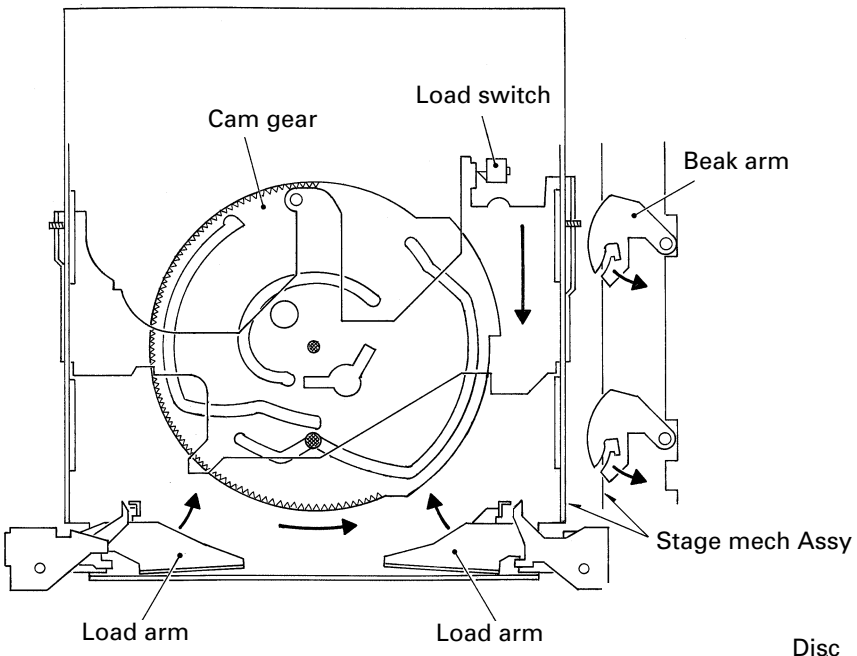


Fig. 21: Elevation OK position

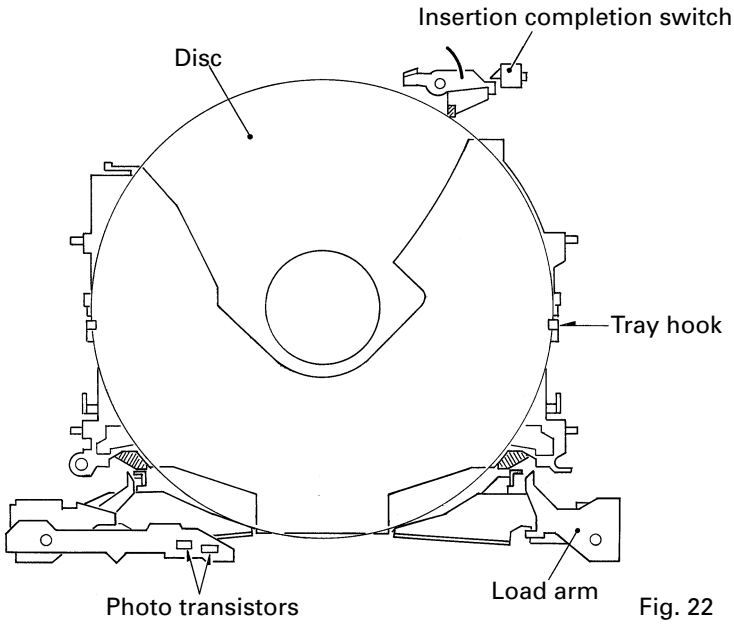


Fig. 22

3.2 Elevation

a)The Cam gear rotates to the elevation OK position.
b)The ELV motor rotates to slide the elevation lever via the gears.
c)The 2 elevation levers (left and right) can synchronize their sliding via the joint arm.
d)The shafts of the Stage Mech Assy engage with the stair-like grooves in the elevation levers and the vertical holes in the Main chassis via the rollers.
e) When the elevation levers slide, the Stage Mech Assy moves up and down.

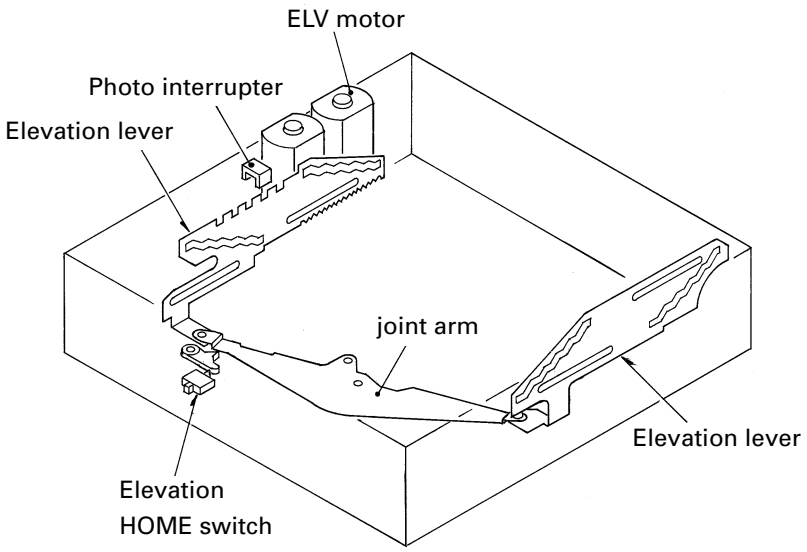


Fig. 23

3.3 Elevation Detection

a)The elevation detection (slit count) is performed by the photo interrupter.
b)After the elevation HOME switch is turned ON, the photo interrupter counts the slits of the elevation levers.
* The bottom position (the 1st stage) is detected when the elevation HOME switch is turned on (not detected by the photo interrupter).

3.4 Disc Clamp

a)The Stage Mech Assy moves up and down to reach the height of the selected tray, using the elevation mechanism.

b)The Cam gear rotates clockwise, the Carriage drive arm rotates, and then the Carriage Mech Assy moves toward the disc via the Carriage drive shaft.

c)The Cam gear continues rotating clockwise and the Carriage drive shaft moves the Clamp UP lever. Then the Clamp arm touching the Clamp UP roller moves down to clamp the disc.

d)The Cam gear stops when the Clamp switch is turned ON.

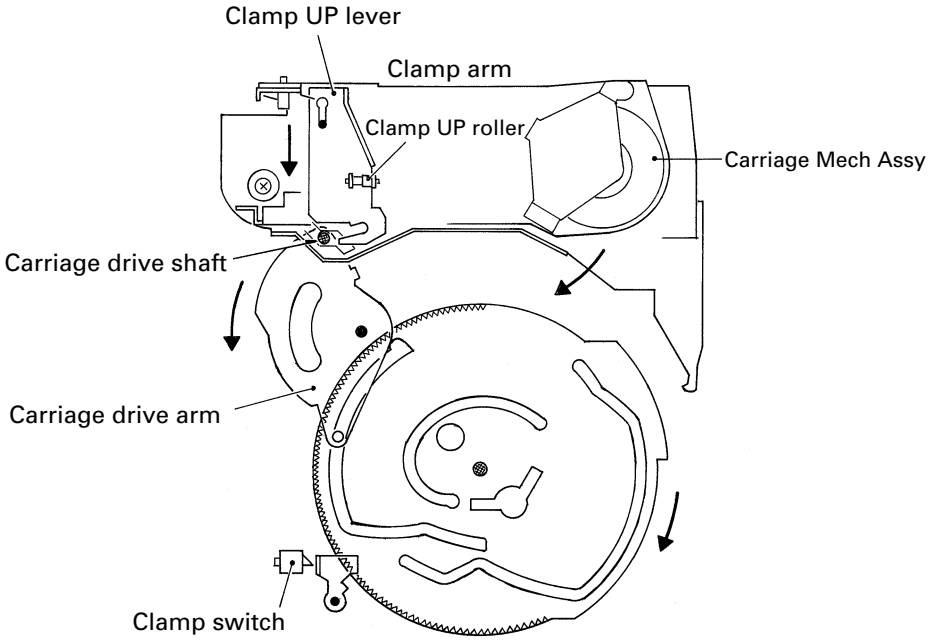


Fig. 24

3.5 Disc Sense (Initializing)

a)The disc sense operation is to detect if or not a disc is loaded on the trays 1 to 6.

b)While a disc is inserted using the robber rollers, the disc pushes the insertion completion switch via the arm to sense that a disc is loaded.

3.6 Disc Ejection

a)The same operations as the steps a) to e) on "3.1 Disc insertion" are performed.

b)The rubber roller(s) rotate(s) in the direction for disc ejection.

c)When the infrared LED light, which has been interrupted by the disc, passes toward the photo transistors, the rubber rollers stops.

3.7 Mechanism Lock

a)Mechanism lock operation is to push the mechanism downward and toward the disc slot in order to keep the mechanism at the correct position during disc insertion/ejection, and to leave the appropriate gap above the mechanism.

b)The Cam gear rotates to move the Mech lock lever toward the rear of the Mechanism. The lever pushes the inside surface of the product. It causes the mechanism to move forward.

c)With the movement of the Mech lock lever, the Mech lock lever (right) moves in a slanting direction as indicated by the arrow in Fig. 25 to push the mechanism forward and downward.

d)The Mech lock lever (left) is driven by the movement of the Mech lock lever via the Mech lock junction lever to push the Mechanism downward.

e)The mechanism lock is released only in the disc clamp mode.

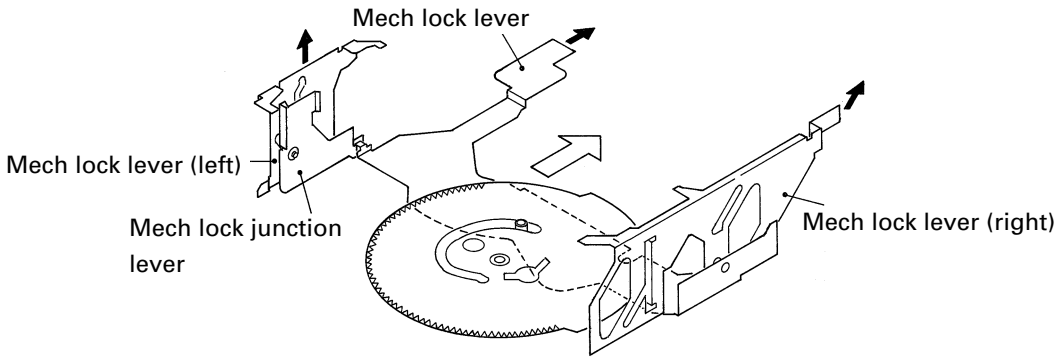


Fig. 25

3.8 Door Open

a)The Door open lever pushes the door on the product grille to open it.

b)The Cam gear rotates to move the door arm. Then, the door arm moves the door lever.

c)The door lever moves the door open lever via the buffer spring.

d)When the door switch is turned ON, the Cam gear motor stops rotating.

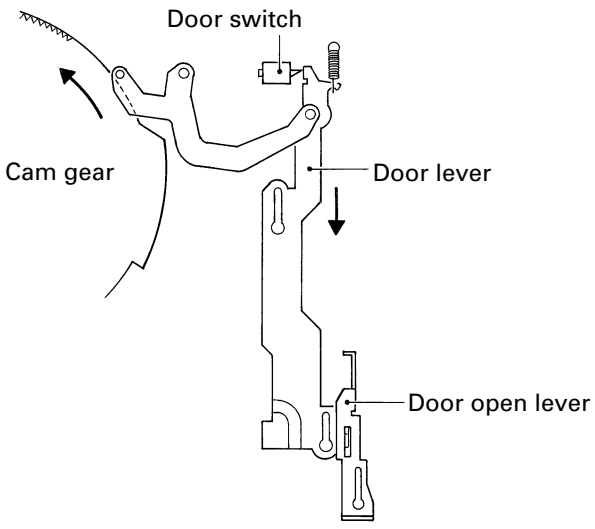


Fig. 26

3.9 Stage Mechanism Lock

a)To prevent the Stage mech assy from rattling during disc play, which may adversely affect the vibration-resistant performance, the Stage lock function works only in the disc clamp mode.

b)In the mode described at the step c) on "3.7 Mechanism lock" , the Stage lock lever (right) is driven by the movement of the Mech lock lever (right).

c)The 2 bent portions of the Stage lock lever (right) are pressed against the gear-like portions of the chassis to lock the right side of the Stage mech assy.

d)For the left side of the Stage mech assy, in the mode described at the step d) on "3.7 Mechanism lock", the Mech lock junction lever is driven to move the Stage lock lever (left).

e)The 2 bent portions of the Stage lock lever (left) are pressed against the gear-like portions of the chassis to lock the left side of the Stage mech assy.

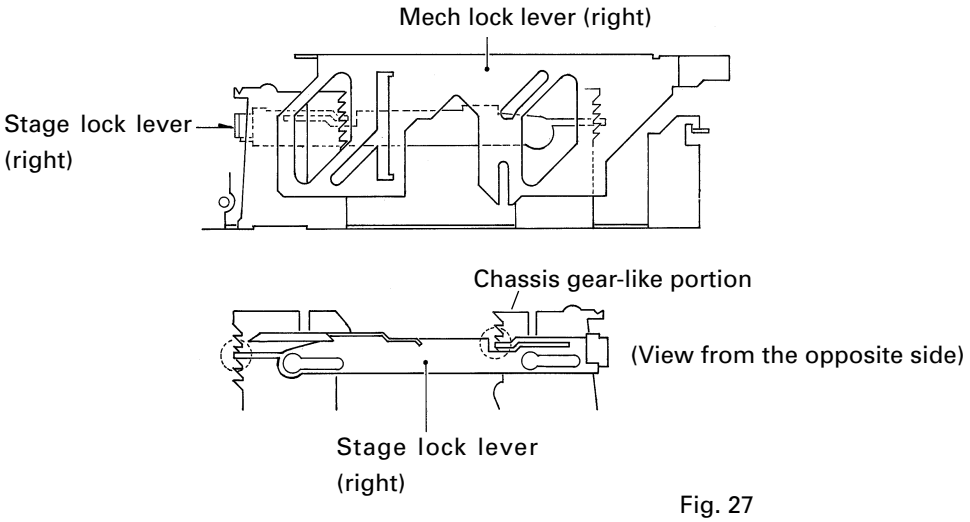

Mech lock lever (right)
Stage lock lever (right)
Chassis gear-like portion
(View from the opposite side)
Stage lock lever (right)

Fig. 27

4. DISASSEMBLY

● How to remove the Tray Assy

1. Apply about 6V current to the Cam gear motor until all holes match at the position (A) (elevation OK position).
2. Hook the three springs B temporarily as shown in Fig. 28. While pushing the Tray holder lock arms (right and left) in the direction (C), remove the Tray holder.
3. Lift up the Tray assy to remove it.

* Be careful not to remove the Tray hooks from the Tray assy.

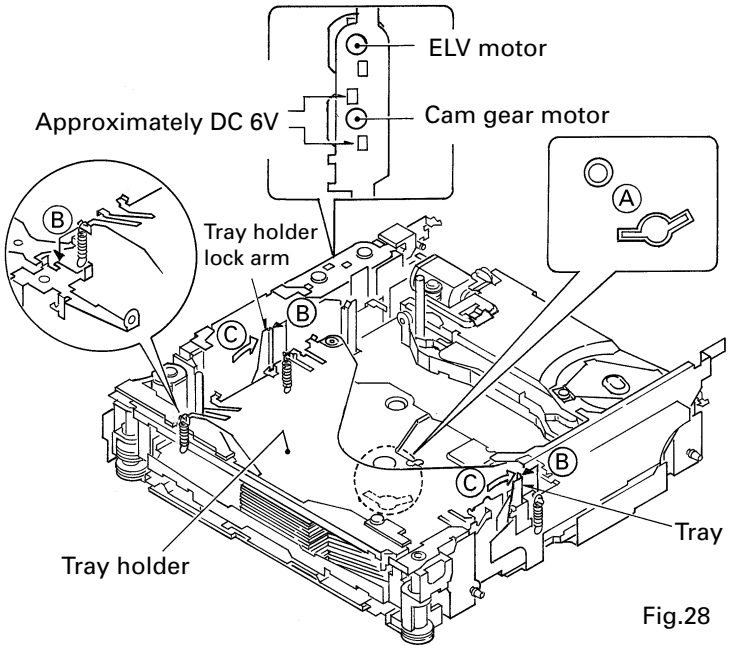


Fig.28

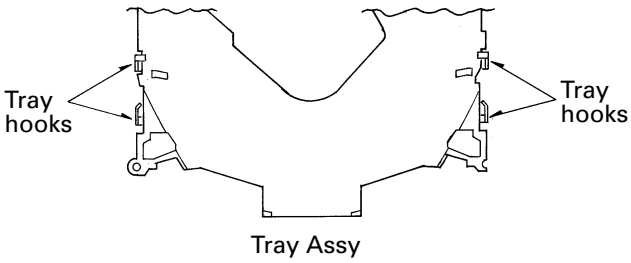


Fig. 29

● How to remove the Carriage Mech Assy

1. Insert a short pin into the flexible PCB of the Pickup unit.
2. While opening the resin hooks, remove the cover from the Servo unit.
3. Disconnect the flexible PCBs from the connectors CN101 and CN301.
4. Remove the Tray holder and the Tray assy. (See above)
5. Rotate the Cam gear motor until the positions of all holes (E) match, then stop the motor.
   (The Carriage Mech assy will stop as shown in the Fig.30.)

* When the positions of all holes match, they will be completely covered by the Carriage mech assy.

* To rotate the Cam Gear motor, see "How to remove the Tray assy".

6. Unhook the spring A.
7. Remove the flexible holder B (while opening the hooks).
8. Remove the flexible PCB (C) from the motor. (The flexible PCB (C) has been stuck on the motor with double-sided adhesive tape.)
9. Loosen the fixing screw and remove the flexible holder.

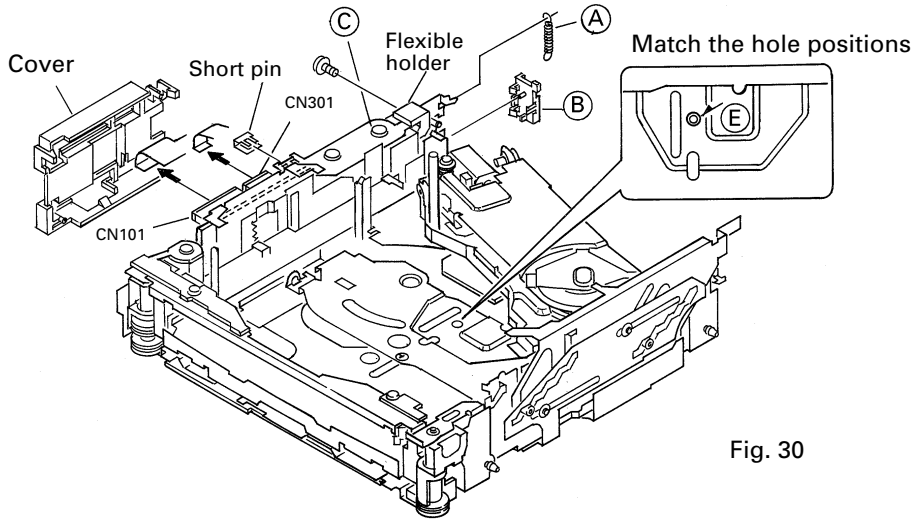


Fig. 30

10. Remove the screw, pressure spring and collar. Lift up the Carriage mech assy to remove it.
    * Screw tightening torque: 2.6kgfcm

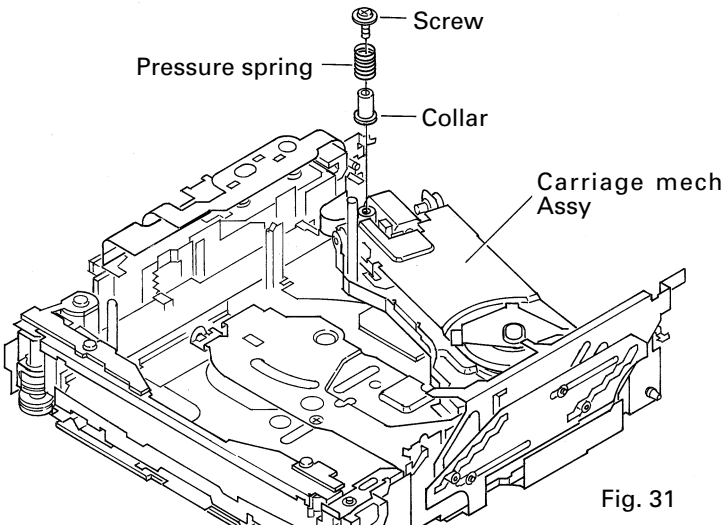


Fig. 31

● How to remove the Pickup unit

1. Remove the pulling spring, torsion spring and E-shaped ring. Then remove the Clamper arm.

* The spring (A) will be removed with the Clamper arm.

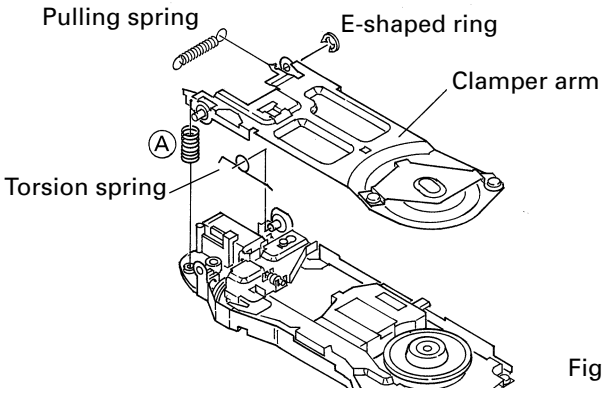


Fig. 32

2. Slide the Clamp UP lever (B) to remove it.
3. Loosen the 2 screws. Remove the feed-screw cover by sliding it.
4. Remove the feed-screw pressure spring (D).
5. Loosen the 2 screws. Remove the feed-screw holder (E).
6. Remove the belt.
7. Remove the Pickup unit together with the feed screw.

* Be careful not to lose the shaft holders at the both ends of the feed screw.

* Be careful not to damage the 2 flexible PCBs(for the Pickup and motor) when separating them. The flexible PCBs have been stuck each other with double-sided adhesive tape.

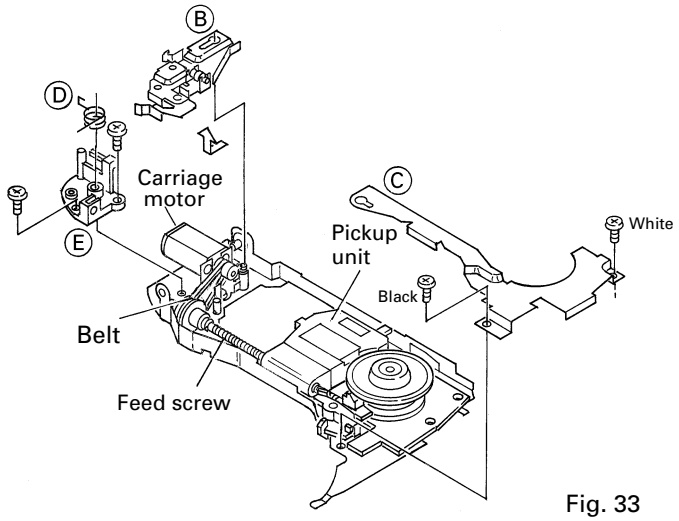


Fig. 33

8. Loosen the 2 screws. Remove the plate spring and the rack.
9. Pull out the feed screw from the Pickup unit.

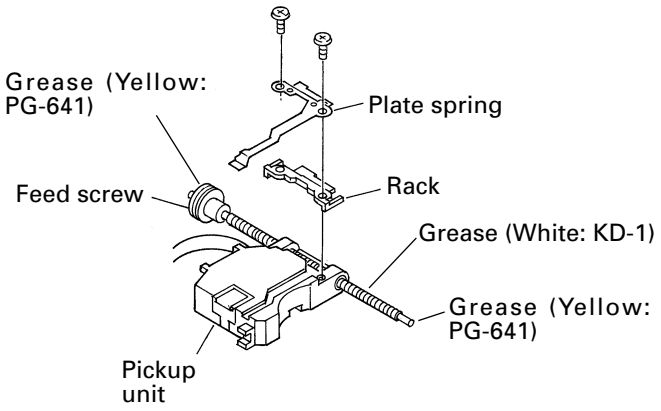


Fig. 34

● How to remove the Carriage Motor Assy

1. Loosen the 2 screws (A). Remove the Carriage motor assy.

● How to remove the Spindle Motor Assy

1. Remove the connector.
2. Loosen the 2 screws (B). Remove the Spindle motor assy.

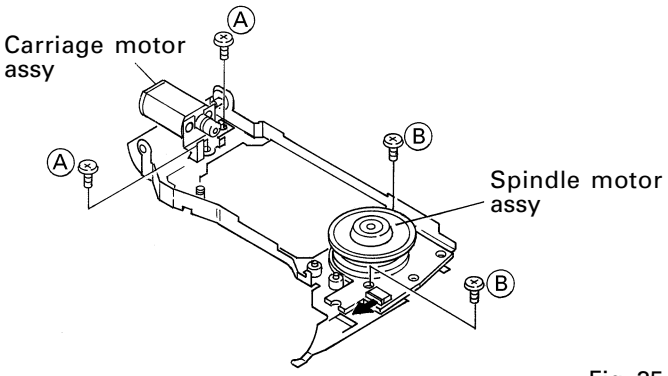


Fig. 35

● How to remove the Cam gear motor and ELV motor

1. Insert a short pin into the Pickup flexible PCB. (See Fig. 30)
   Remove the Cover from the Servo unit. (See Fig. 30)
   Disconnect the flexible PCBs from the connectors CN101 and CN301. (See Fig. 30)
2. Disconnect the the flexible PCB (Motor PCB(A)) from the connector CN201 on the Servo unit.
3. Disconnect the flexible PCB from the connector CN801 on the STS unit.
4. Loosen the 2 screws (A). Remove the Servo unit.
5. Loosen the screw (B). Remove the flexible PCB holder.
6. De-solder at the 4 portions (C). Remove the flexible PCB.

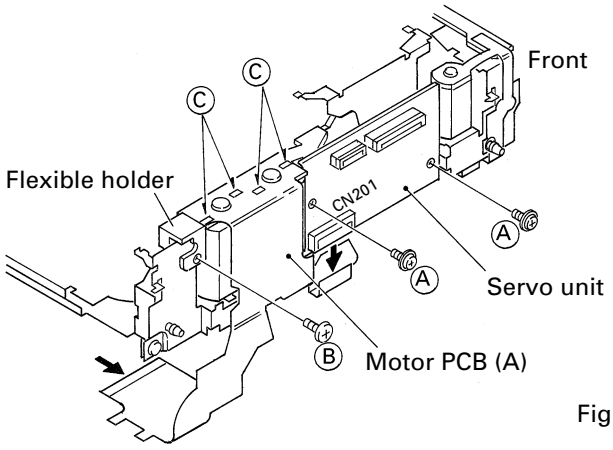


Fig. 36

7. Loosen the 2 screws (D). Remove the Gear cover.
8. Loosen the 3 screws (E). Remove the Motor bracket assy.

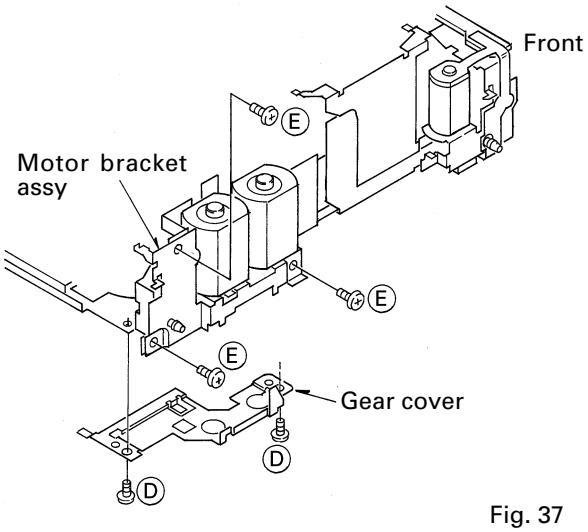


Fig. 37

9. Remove the 5 polyslider washers, then gears and shaft.
10. Loosen the 4 screws. Remove the Cam gear motor and ELV motor.

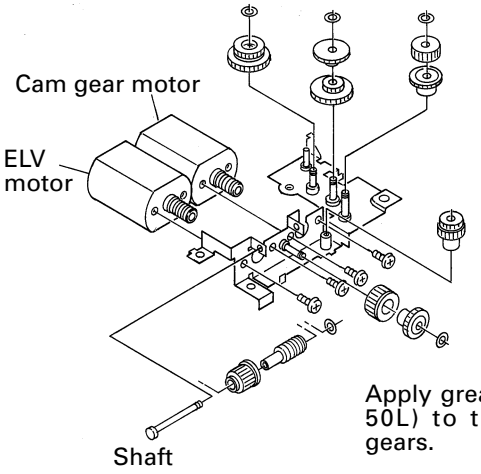


Fig. 38

● How to remove the Loading motor

1. Insert a short pin into the flexible PCB of the Pickup unit.(See Fig. 30)
   Remove the Cover from the Servo unit. (See Fig. 30)
   Disconnect the flexible PCBs from the connectors CN101 and CN301. (See Fig. 30)
   Disconnect the the flexible PCB (Motor PCB (A)) from the connector CN201 on the Servo unit. (See Fig. 36)
2. Unhook the spring. Remove the Door open lever.
3. Loosen the 3 screws. Remove the PCB units (C) & (D) and the frame.
4. Remove the spring (A).

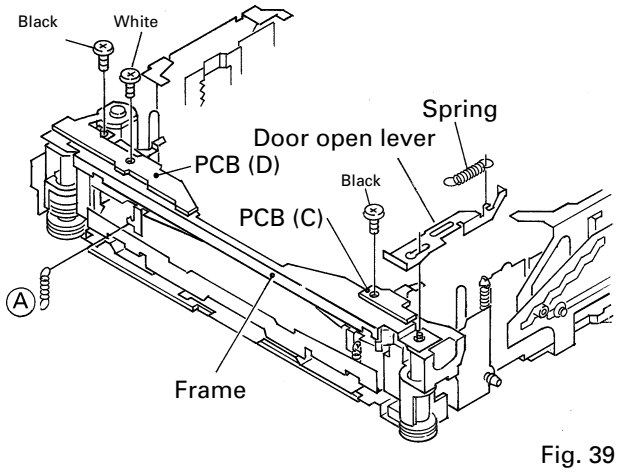


Fig. 39

5. Remove the belt (large).
6. De-solder at the points (B) and (C).
7. Loosen the 2 screws. Remove the Loading motor bracket.
8. Remove the belt (small).
9. Loosen the 2 screws. Remove the Loading motor.

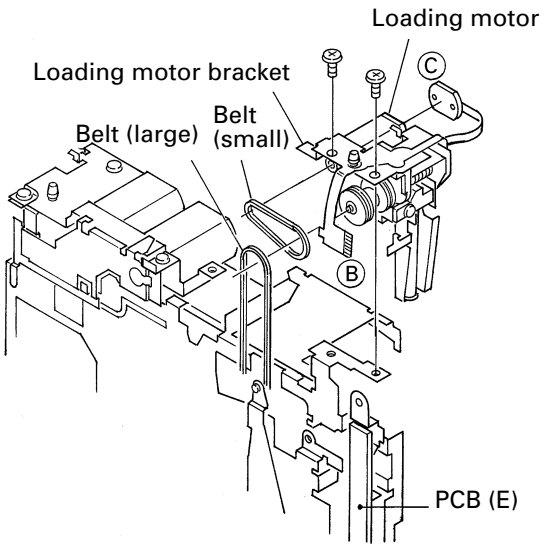


Fig. 40

● How to remove the Stage Mech Assy

1. Remove the Tray holder and the Tray assy. (See Fig. 28)
   Remove the Carriage mech assy. (See Fig. 30 and 31)
   Remove the Servo unit. (See Fig. 36)
   Remove the Motor PCB (A). (See Fig. 36)
   Remove the Gear cover. (Fig. 37)
2. Unhook the Spring (C). Remove the Door-open lever.
3. Loosen the screws (D), (E), and (F). Remove the PCB (C) and (D), and the frame.
4. Unhook the springs (A) and (B).
5. Pull out the Load arm assy (right) upward.
6. Unhook the spring (G). Remove the belt (large).
7. Loosen the screw (H). Remove the Load arm assy

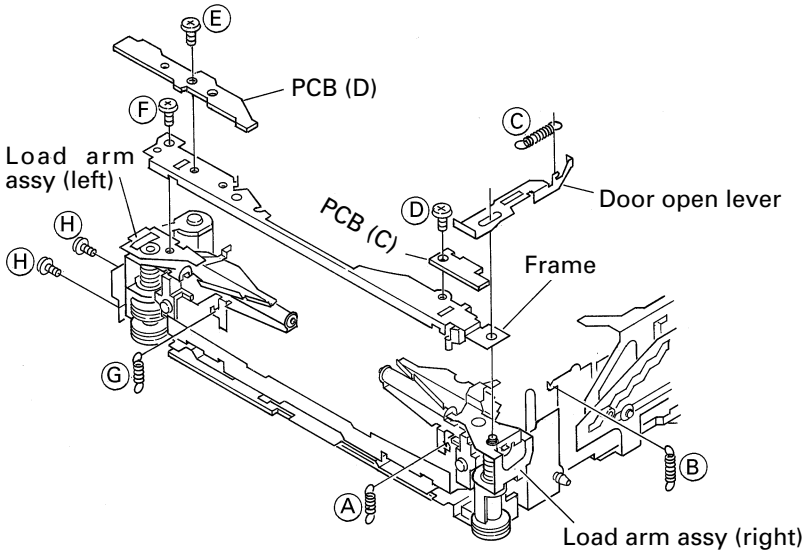


Fig. 41

(left) including the Loading motor.

8. Loosen the 4 screws. Remove the Motor bracket assy and Photo interrupter.

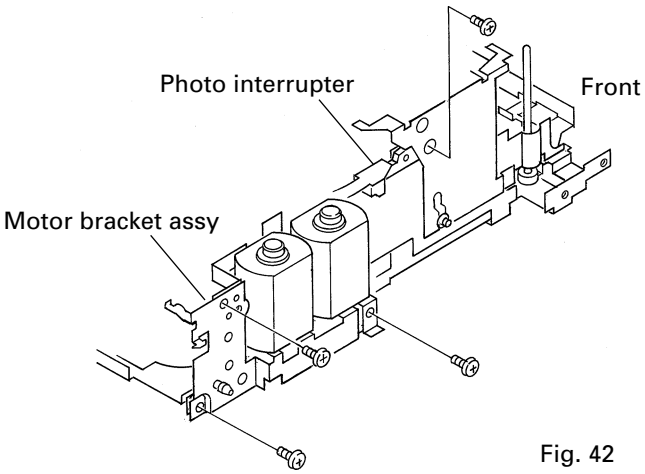


Fig. 42

9. Remove the 4 E-shaped rings (A) and 3 washers (B).
10. Remove the Mech lock lever (left).
11. Remove the 2 rollers (C).
12. Remove the Elevation lever (left). (Pay attention to the mounting direction.)
13. Remove the Mech lock junction lever and and roller (D).

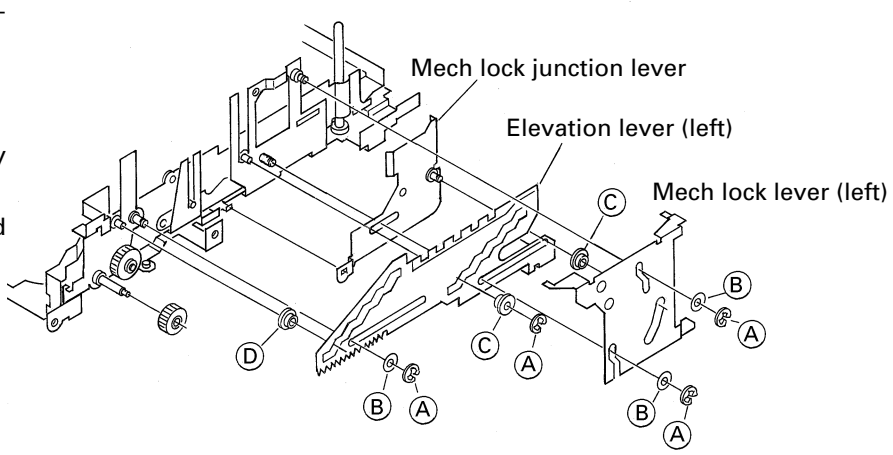


Fig. 43

(Pay attention to the mounting direction.)

14. Remove the 2 E-shaped rings (A) and 2 washers (B).
15. Remove the Elevation lever (right).
16. Remove the 2 rollers (C). (Pay attention to the mounting direction.)
17. Remove the Mech lock lever (right).
18. Lift up the Stage mech assy to remove it.

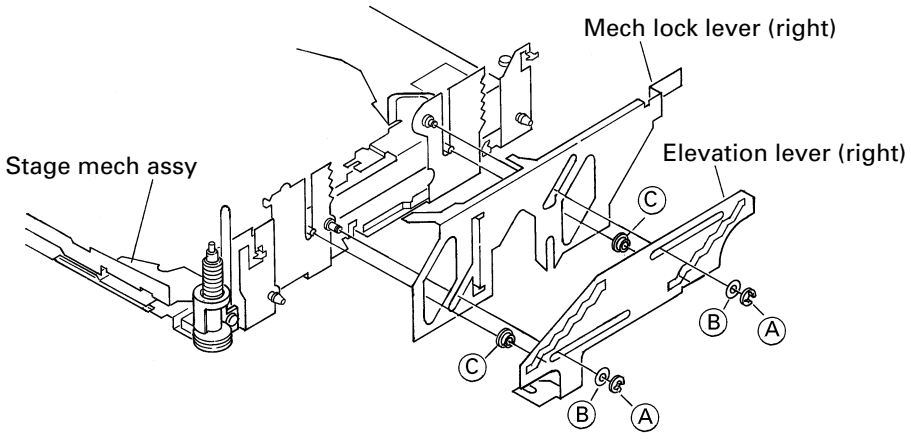


Fig. 44